SONY

DIGITAL TIMEBASE CORRECTOR

# BKH-2350

INSTALLATION AND MAINTENANCE MANUAL

1st Edition (Revised 2)

Serial No. 10001 and Higher

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# SECTION 1
# OPERATION



## 1-1. OUTLINE

The BKH-2350 is a plug-in type time base corrector composed of four circuit boards for the Sony 1-inch video tape recorder BVH-2000PS*/2180PS. This time base corrector has been designed to be used in the BVH-2000PS*/2180PS electronic bay. It provides a wide range of time base correction, so that a high quality picture can be obtained in normal playback and in dynamic tracking playback of −1 to +3 times normal speed.

## 1-2. FEATURES

- PAL or SECAM color system can be selected by the built-in switch.
- Velocity error is compensated with the approximate curve to obtain a high quality picture. (PAL mode only).
- Built-in drop-out compensator replaces the drop-out section of Y signal with the 1 H and of C signal with 2 H prior signal. The C signal is replaced by the line 2H prior to the line having the drop-out section in the SECAM mode.
- Horizontal lines from the seventh to the twenty second of the V-blanking can be set to on and off independently with the S2 and S3 switches on the SG-17 board.
- In shuttle mode, a picture can be searched in color up to ±7 times normal speed and in monochrome up to ±50 times normal speed.
- Remote-control is possible with an external equipment.
- Playback sampling is 8 bits x 4 fsc.
- The built-in vertical-ID generator (switchable) is activated in the SECAM mode.
- The chrominance signal of the video signal can be cut off by the S1 switch on the MY-26 board.

* When the BKH-2350 is installed into the BVH-2000PS, make sure the BVH-2000PS has the serial No. 33401 or higher. The BVH-2000PS with a lower serial No. cannot be used.

## 1-3. SPECIFICATIONS

### 1-3-1. General

| | |
|---|---|
| Power consumption | 43.0 W |
| Dimensions | 23 x 155 x 325 mm (w/h/d) (29/32 x 6 1/8 x 12 7/8 inches) |
| Weight | 2.5 kg (including 4 boards) (5 lb 8 oz) |
| Operating temperature | 5°C to 40°C (41°F to 104°F) |

### 1-3-2. Video

| | |
|---|---|
| Bandwidth | Flat to 5.0 MHz ±0.3 dB |
| Signal-to-noise ratio | 53 dB |
| DG | Less than 2% (PAL) |
| DP | Less than 2° (PAL) |
| K-factor | Less than 1% |
| Window | 15 H(p-p) |
| Residual error | PAL: within ±3 ns<br>SECAM or Monochrome: within ±15 ns |
| Y/C delay | Within 20 ns |

### 1-3-3. Processor Adjustment Range

| | |
|---|---|
| OUTPUT VIDEO LEVEL | ±3 dB |
| CHROMA LEVEL | ±3 dB (PAL) |
| BLACK LEVEL | ±100 mV (PAL) |
| BURST CHROMA PHASE | ±10° (PAL) |
| SYSTEM SC PHASE | More than 360° (PAL) |
| SYSTEM SYNC PHASE | −1 to +3 μs |

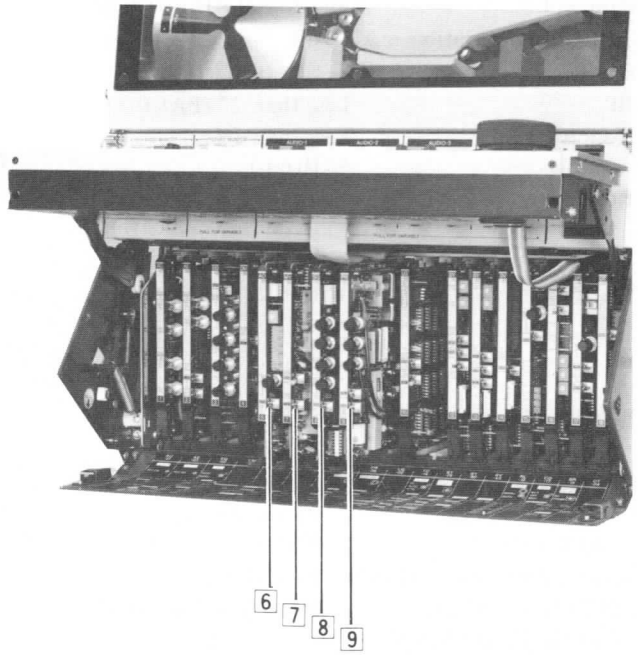
Design and specifications subject to change without notice.

## 1-4. INSTALLATION

### 1-4-1. Installation Notes

- Turn the power off to install boards.
- Correctly install the boards into the slots referring to the numbers on the boards and on the slots as shown below.
- Before turning the power on, check that the boards are installed into the correct slots. **If they are installed into the wrong slots, the circuit may be broken.**

Do not remove or reinsert the boards unless it is necessary.

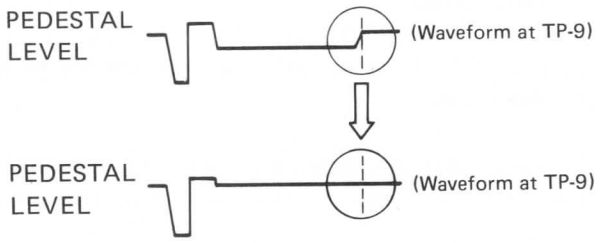


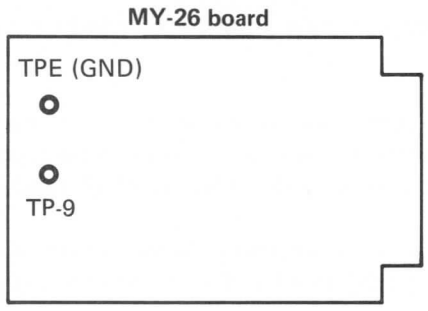

| | Board No. | Board Name | |
|---|---|---|---|
| BKH-2350 | 6 | AD-22 | A/D CONVERTER |
| | 7 | MY-26 | MEMORY |
| | 8 | SG-17 | SYNC GENERATOR |
| | 9 | PR-63 | PROCESSOR |

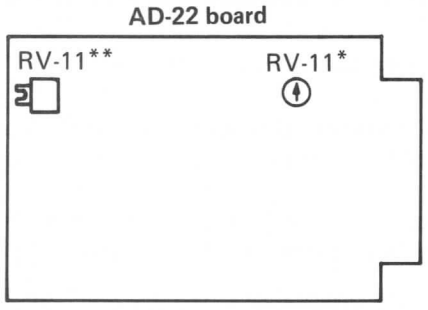
### 1-4-2. Initial Setting

**Pedestal level offset adjustment**

Adjust the RV-11 on the AD-22 board so that the waveform at the TP-9 on the MY-26 board will be as shown below. (On a BKH-2350 with serial numbers 10001 to 10250, the RV-11 cannot be reached from the front of the AD-22 board. Therefore, pull out the AD-22 board using an extension board.)




* On a BKH-2350 with serial numbers 10001 to 10250, the RV-11 is located at the position marked with one asterisk.

**On a BKH-2350 with serial numbers 10301 and higher, the RV-11 is located at the position marked with two asterisks.

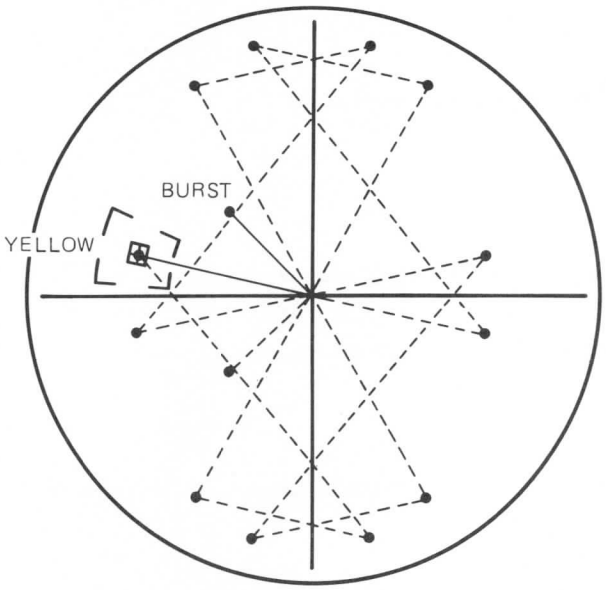
**BURST CHROMA PHASE preset (PAL mode only)**

**When the BK-2007 remote control unit (optional) is used,** set the REMOTE/LOCAL switch (S1) on the SG-17 board **to REMOTE, and the BURST-CHROMA switch on the BK-2007 to PRESET.**

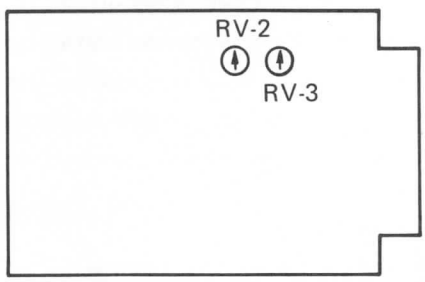
**When the BK-2007 is not used, set the REMOTE/LOCAL** switch (S1) on the SG-17 board to LOCAL, and turn the **BURST-CHROMA control so that the output at the center pin of the BURST-CHROMA volume will be 0 V.**

Adjust the RV-3 on the SG-17 board, so that the chroma phase of the normal playback signal corresponds with that of the dynamic tracking playback signal (tape speed: still). Then adjust the RV-2 on the same board so that the relative phase of the BURST and YELLOW of the normal playback signal becomes as illustrated below on the vectorscope.

- For adjustment, use the tape on which a color bar signal is recorded.

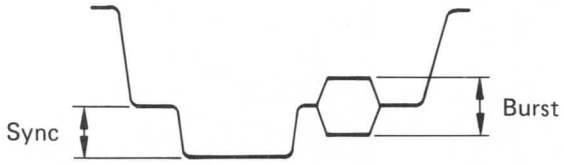



**SG-17 board**



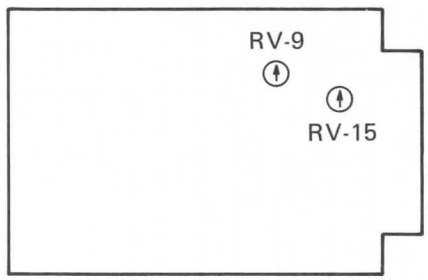

**Sync and burst signal level adjustments**

Pull out the PR-63 board using an extension board. While observing the video output signal from the VDEO-1 OUTPUT connector of the BVH-2000PS/2180PS on the waveform monitor, adjust the levels of the sync and burst signals. To change the sync signal level, adjust the RV-15 on the PR-63 board; to change the burst signal level, adjust the RV-9 on the PR-63 board.



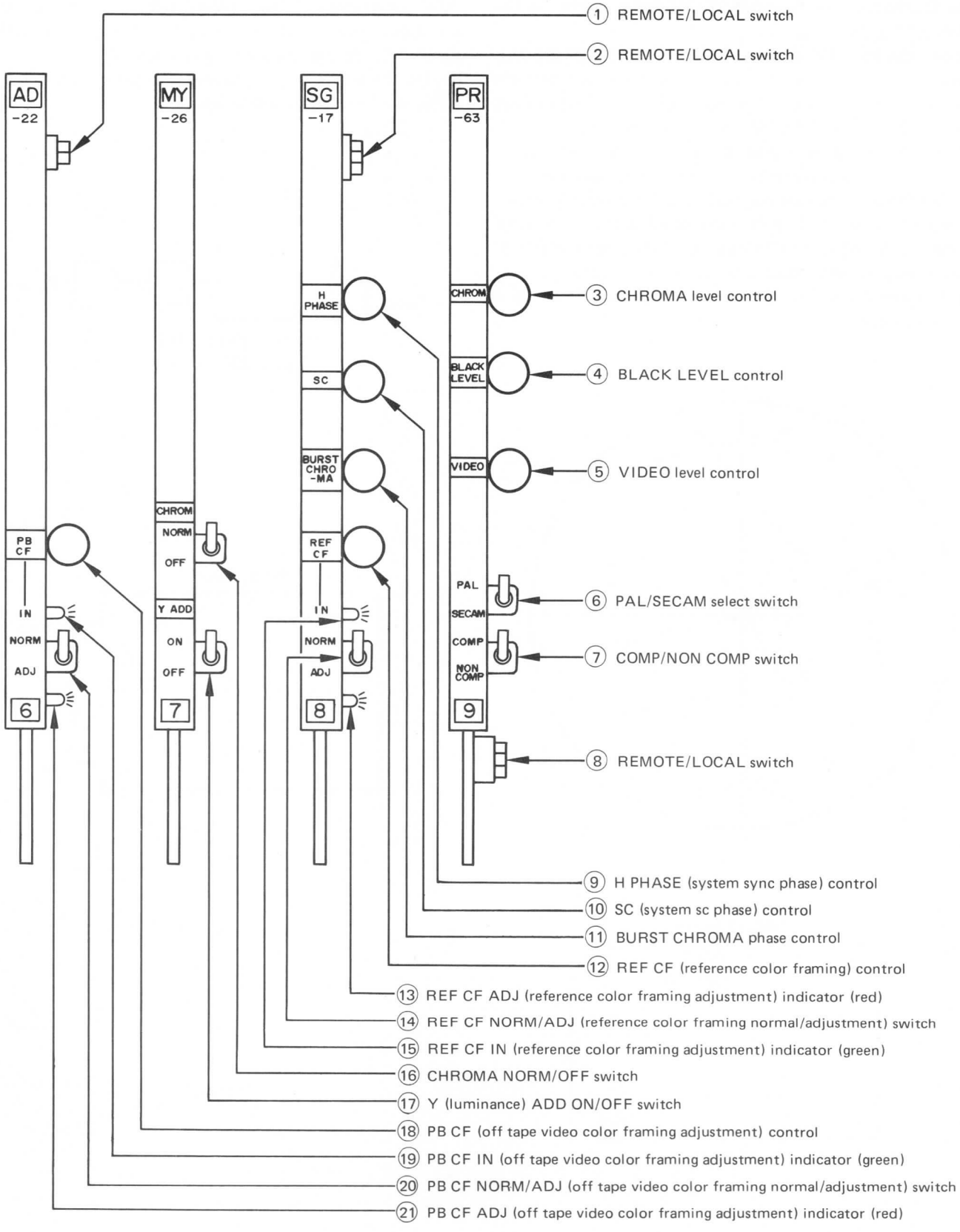

Sync: 300 ± 6 mV
Burst: 300 ± 6 mV

**PR-63 board**



## 1-5. LOCATION AND FUCTION OF PARTS

### 1-5-1. Front Panel



**① REMOTE/LOCAL switch (for PB CF and PB CF NORM/ADJ switches)**

Set to REMOTE when a remote control unit is used.

**Note:** These switches should be set to the same position.

**② REMOTE/LOCAL switch (for H PHASE, SC, BURST CHROMA phase controls)**

Set to REMOTE when a remote control unit is used.

**③ CHROMA level control***

The chroma level can be adjusted within a range of ±3 dB.

**④ BLACK LEVEL control***

The black level can be adjusted from −100 mV to +100 mV.

**⑤ VIDEO level control**

The video level can be adjusted within a range of ±3 dB.

**⑥ PAL/SECAM select switch**

The color system, PAL or SECAM, is selected.

**⑦ COMP/NON COMP switch**

The output signal of the VIDEO-3 OUTPUT connector on the BVH-2000PS/2180PS is selected, composite video or non-composite video.

**⑧ REMOTE/LOCAL switch (for CHROMA, BLACK LEVEL, VIDEO)**

Set to REMOTE when a remote control unit is used.

**⑨ H PHASE (system sync phase) control**

The H phase of the playback signal can be adjusted to that of the reference video signal. The adjustable range is −1 to +3 μs.

**⑩ SC (system sc phase) control***

The SC phase of the playback signal can be adjusted to that of the reference video signal. The adjustable range is 360° and more.

**⑪ BURST CHROMA phase control***

The burst chroma phase can be adjusted within a range of ±10°.

**⑫ REF CF (reference color framing) control***

The SC-H phase of the reference video signal can be adjusted.

**⑬ REF CF ADJ (reference color framing adjustment) indicator (red)***

This indicator lights while adjusting the reference color framing.

**⑭ REF CF NORM/ADJ (reference color framing normal/adjustment) switch***

To adjust the reference color framing, set this switch to ADJ; in other cases, set it to NORMAL.

**⑮ REF CF IN (reference color framing adjustment) indicator (green)***

This indicator lights to indicate the optimum SC-H phase of the reference video signal.

**⑯ CHROMA NORM/OFF (chroma normal/off) switch**

Usually set the switch to NORM. At the OFF position, the chrominance signal of the video signal is cut off.

**⑰ Y (luminance) ADD ON/OFF switch**

At the ON position, a luminance signal is added by line to maintain the interleave of the output signal, when the field relation is reversed during dynamic tracking playback.

At the OFF position, no luminance signal is added.

The video signal is not added during vertical blanking period.

**⑱ PB CF (off tape video color framing) control***

The SC-H phase of the off tape video signal can be adjusted.

**⑲ PB CF IN (off tape video color framing adjustment) indicator (green)***

This indicator lights to indicate the optimum SC-H phase of the off tape video signal.

**⑳ PB CF NORM/ADJ (off tape color framing normal/adjustment) switch***

To adjust the color framing of the off tape video signal with the PB CF control, set this switch to ADJ. In other cases, set the switch to NORM.

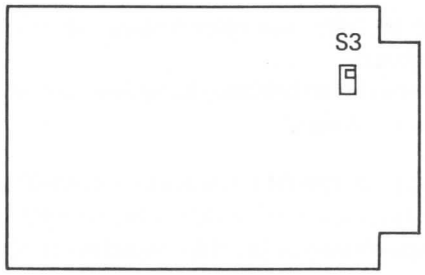
**㉑ PB CF ADJ (off tape color framing adjustment) indicator (red)***

This indicator lights while the color framing of the off tape video signal is being adjusted.

* These controls, switches and indicators are effective only when the PAL/SECAM select switch ⑥ is set to PAL.

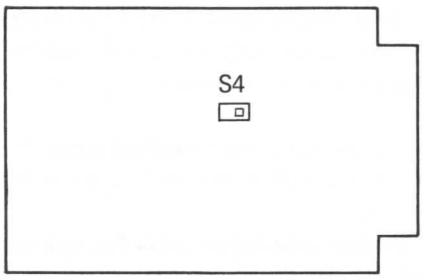
## 1-5-2. On the Boards

### AD-22 board



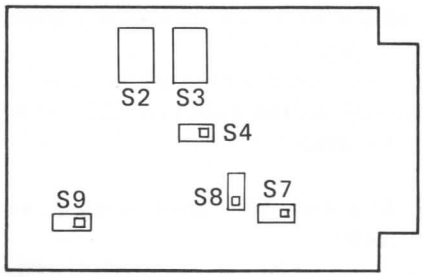

S3: At the ON position, the noise is not included in the TBC output signal if the STANDBY lamp goes out when the TAPE/EE selector on the VTR is set to TAPE. At the OFF position, the DEMOD OUT signal including the noise is output.

### MY-26 board




S4: The drop-out compensator is turned on and off. Be sure to set to ON.

### SG-17 board




S2: At the ON (right) position, horizontal lines from 7 (320) to 14 (327) are blanked.
At the OFF (left) position, the lines are not blanked.

S3: At the ON (right) position, the horizontal lines from 15 (328) to 22 (335) are blanked.
At the OFF (left) position, the lines are not blanked.

S4: At the ON position in SECAM mode, V-ID signal is replaced with the V-ID signal generated by the TBC. At the OFF position, the signal is not replaced.
In the PAL mode, this switch has no function.

S7: At the ON position, the sync signal of the TBC output signal is delayed by 4 H against the reference signal in the preview mode so that the relative phase of the video and sync signals will be the same.
At the OFF position, the sync signal of the TBC output signal is synchronized with the reference signal so that the video signal is shifted by 2 through 6 H vertically.

S8: At the ON position, the sync signal of the TBC output signal is delayed by 4 H against the reference signal in the E-to-E mode so that the relative phase of the video and sync signal will be the same.
At the OFF position, the sync signal of the TBC output signal is synchronized with the reference signal so that the video signal is shifted by 4 H vertically.

Operation at each setting of the S7 and S8 switches is shown below.
When the video and sync signals which are delayed by 4 H are monitored on a picture monitor in the internal sync mode, the vertical shift of the picture does not occur in the preview mode so that a normal picture can be monitored.

| Switch | S7 | | S8 | |
|---|---|---|---|---|
| | ON | OFF | ON | OFF |
| PLAY (EDIT preset) | Sync and video signals are delayed by 4 H. | Sync signal is delayed by 0 H, and video signal is delayed by 2 to 6 H. | Not related | |
| E-to-E | Not related | | Sync and video signals are delayed by 4 H. | Sync signal is delayed by 0 H, and video signal is delayed by 4 H. |

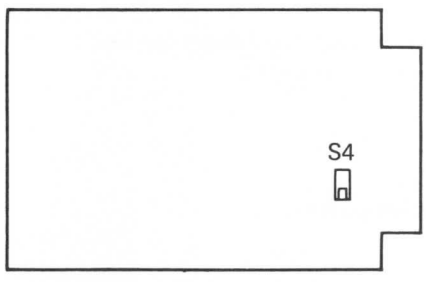
- The amount of delay of the TBC output signal against the reference signal is shown.

S9: At the ON position, the horizontal lines from 7 (320) to 22 (335) are blanked regardless of the S2 and S3 switch settings.
At the OFF position, blanking period is determined by the S2 and S3 switches.

**Note**

When the V-ID ON/OFF switch (S4) is set to ON in the SECAM mode, the horizontal lines from 7 (320) to 15 (328) are not blanked. The half H blanking of the horizontal line 23 is always set in the PAL mode and is never set in the SECAM mode.

**PR-63 board**




S4: At the ON position, the color burst signal is added to the TBC output signal except when the servo reference signal does not include the color burst signal.
At the OFF position, the color burst signal is not added.

## 1-6. ADJUSTMENTS

The following adjustments are required for the PAL color system only. When the SECAM signal is used, skip this step.

### Adjusting the color framing (the optimum SC-H phase) of the reference signal

| Operation | Remarks |
|---|---|
| Connect the reference signal. | |
| Adjust the H PHASE control and the SC control. | |
| Set the REF CF NORM/ADJ switch (14) to ADJ. | Adjustment begins.<br>The REF CF ADJ indicator (red) (13) is lit while adjusting. |
| Turn the REF CF control (12) so that the REF CF IN indicator (green) (15) lights. | The SC-H phase of the reference signal can be adjusted to the optimum value. |
| Set the REF CF NORM/ADJ switch to NORM. | Adjustment completed.<br>The REF CF ADJ indicator goes off. |

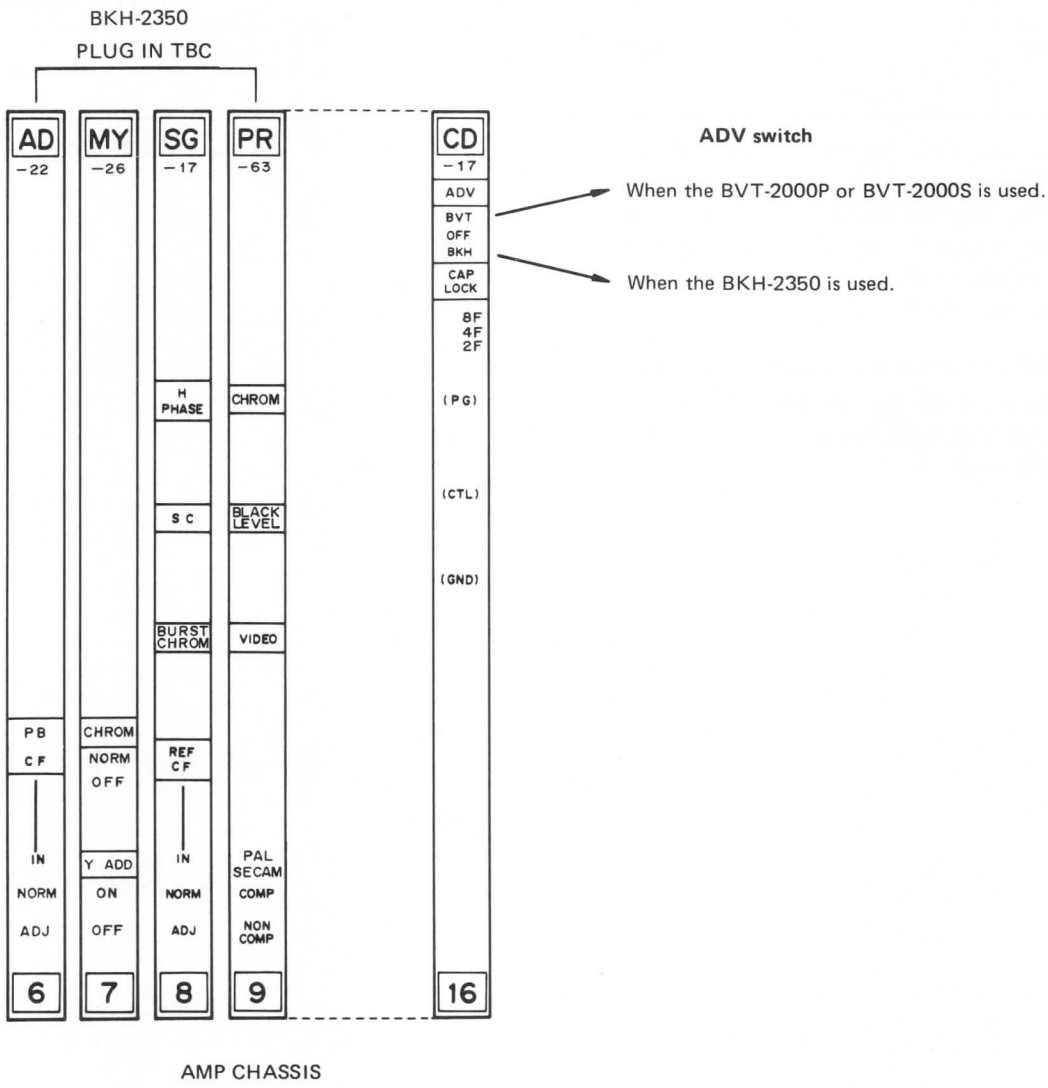
### Adjusting the color framing (the optimum SC-H phase) of the off tape video signal

| Operation | Remarks |
|---|---|
| Play the tape back with a normal speed in forward direction. | |
| Set the PB CF NORM/ADJ switch (20) to ADJ. | Adjustment begins.<br>The PB CF ADJ indicator (red) (21) is lit while adjusting. |
| Turn the PB CF control (18) so that the PB CF IN indicator (19) lights. | The SC-H phase of the off tape video signal can be adjusted to the optimum value. |
| Set the PB CF NORM/ADJ switch to NORM. | Adjustment completed.<br>The PB CF ADJ indicator goes off. |

## 1-7. OPERATION

**Selection of phase advance**

Set the ADV switch on the CD-17 board of the BVH-2000PS/2180PS to BKH.



### Setting of the REMOTE/LOCAL switch

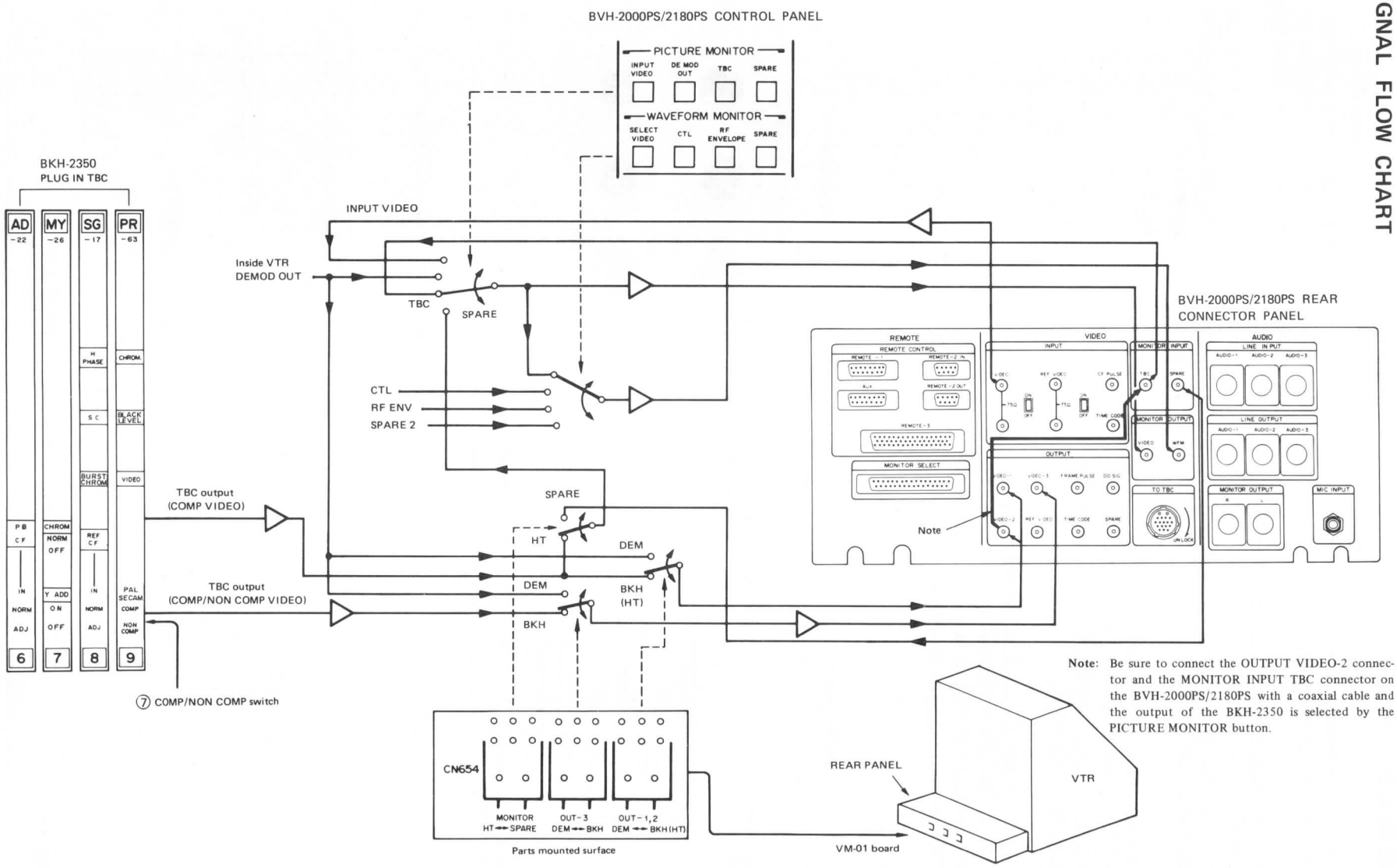
Set the REMOTE/LOCAL switches on the SG-17, AD-22 and PR-63 boards to LOCAL.

### Selection of the TBC OUT

| OUTPUT | OUT-3 DEM↔BKH switch on the VM-01 board | OUT-1, 2 DEM↔BKH(HT) switch on the VM-01 board | PICTURE MONITOR select button on VTR | WAVEFORM MONITOR select button on VTR |
|---|---|---|---|---|
| MONITOR VIDEO** | | BKH | TBC | |
| MONITOR WFM** | | BKH | TBC | SELECT VIDEO |
| VIDEO-1, VIDEO-2 | | BKH | | |
| VIDEO-3 | BKH* | | | |

* When the OUT-3 switch on the VM-01 board of the BVH-2000PS/2180PS is set to BKH, the output signal of the BKH-2350 is fed from the VIDEO-3 connector. The COMP/NON COMP switch on the PR-63 board decides the output signal of the VIDEO-3 connector, composite signal or non-composite signal.

** The OUTPUT VIDEO-2 connector and the MONITOR INPUT TBC connector on the BVH-2000PS/2180PS should be connected with a coaxial cable, or the output signal cannot be obtained.




**Note:** Be sure to connect the OUTPUT VIDEO-2 connector and the MONITOR INPUT TBC connector on the BVH-2000PS/2180PS with a coaxial cable and the output of the BKH-2350 is selected by the PICTURE MONITOR button.

## 1-9. REMOTE CONTROL

Remote control will be possible in the following cases.

- When the BK-2007 remote control unit (optional) is used.
- When the BVH-2000PS is installed into a SU-910 console unit with the SUA-911 (monitor bridge).
- When the BVH-2180PS is installed into a console SU-950 or SU-960 with the SUA-951.

The following items can be controlled remotely.
VIDEO LEVEL, BLACK LEVEL, CHROMA LEVEL, BURST-CHROMA PHASE, SYSTEM SC PHASE, SYSTEM SYNC PHASE, PB CF ADJUST*

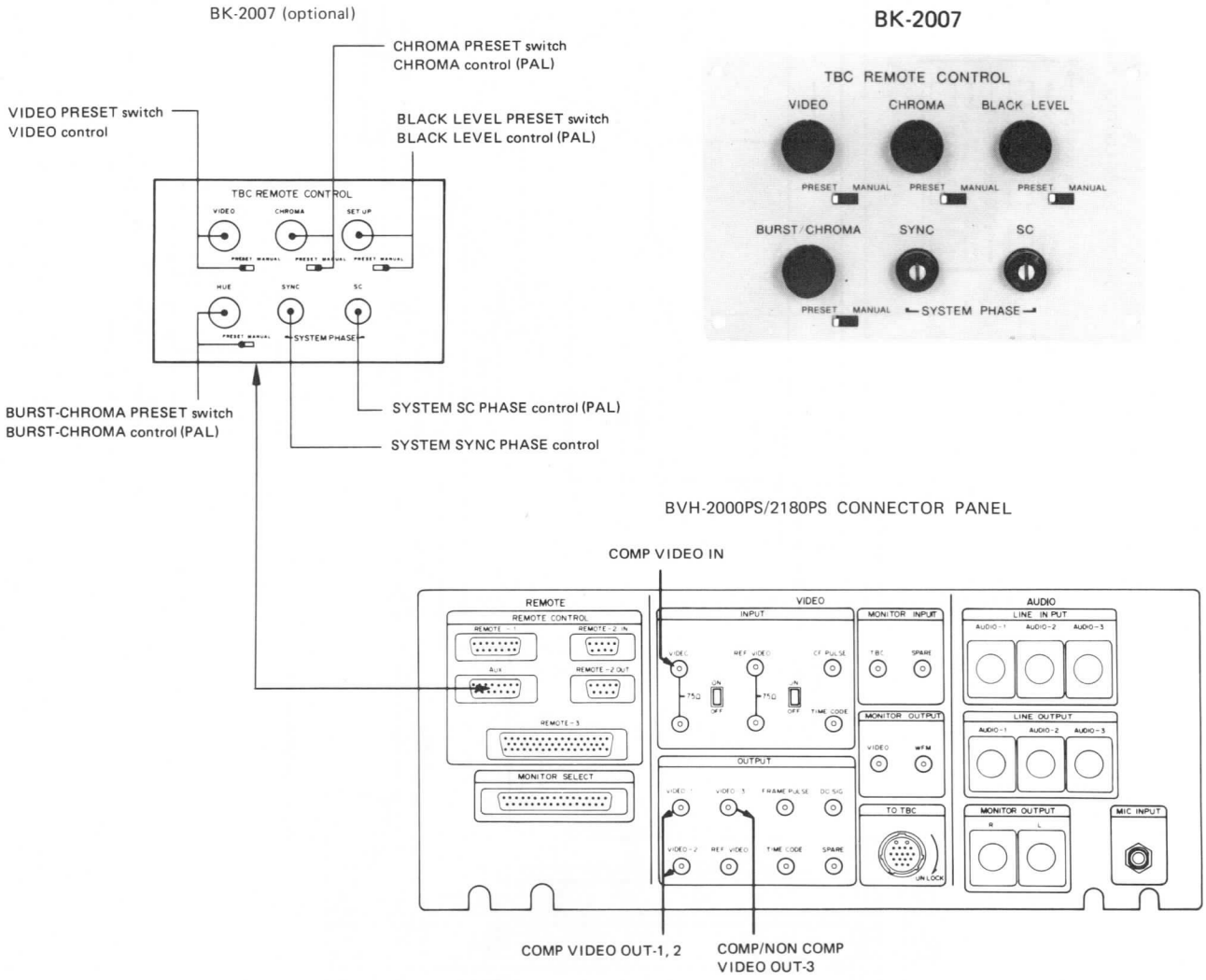
* PB CF ADJUST can be remotely controlled by the SUA-951 or by the SUA-911 having a serial No. 30000 or higher. The SUA-911 with a lower serial number and the BK-2007 cannot be used for the PB CF ADJUST.

### Switch setting

For remote control, set the switches as follows:
AD-22 board: REMOTE/LOCAL switch ①* to REMOTE.
SG-17 board: REMOTE/LOCAL switch ② to REMOTE.
PR-63 board: REMOTE/LOCAL switch ⑧ to REMOTE.

* The REMOTE/LOCAL switch ① on the AD-22 board should be set to REMOTE only when the PB CF ADJ can be remotely controlled.

### Connection



# SECTION 1
# FONCTIONNEMENT

## 1-1. APERCU GENERAL

Le BKH-2350 est un correcteur de base de temps de type enfichable, composé de quatre plaquettes de circuits et destiné au magnétoscope de 1 pouce Sony BVH-2000PS*/2180PS. Conçu pour s'installer dans la baie électronique du BVH-2000PS*/2180PS, il autorise un large éventail de correction de base de temps et permet l'obtention d'une image vidéo de haute qualité en mode de lecture normale et en mode de lecture à alignement dynamique allant de −1 à +3 fois la vitesse normale.

## 1-2. CARACTERISTIQUES

- Possibilité d'un choix entre le système couleur PAL et SECAM à l'aide d'un sélecteur incorporé.
- Pour obtenir une qualité d'image supérieure, l'erreur de vélocité est compensée par la courbe approximative (en mode PAL uniquement).
- Le compensateur de chute incorporé remplace la section perdue du signal Y par le signal 1 H et du signal C par le signal prioritaire 2 H. Le signal C est remplacé par une ligne 2 H avant la ligne, présentant une section perdue, en mode SECAM.
- Les lignes horizontales de la septième à la vingt-deuxième de la suppression V peuvent être mises en ou hors service indépendamment grâce aux sélecteurs S2 et S3 de la plaquette SG-17.
- En mode "navette", une image peut être recherchée en couleur jusqu'à ±7 fois la vitesse normale et jusqu'à ±50 fois en monochrome.
- Possibilité de télécommande à partir d'un équipement externe.
- L'échantillonnage de lecture est de 8 bits x 4 fsp.
- Le générateur ID vertical incorporé (commutable) est activé en mode SECAM.
- Le signal de chrominance du signal vidéo peut être coupé par l'interrupteur S1 de la plaquette MY-26.

* Lorsque le correcteur de base de temps BKH-2350 est installé dans le BVH-2000PS, confirmer que le numéro de série de ce dernier est N°33401 ou supérieur. Un BVH-2000PS d'un numéro de série inférieur ne peut pas être utilisé.

## 1-3. SPECIFICATIONS

### 1-3-1. Données générales

| | |
|---|---|
| Consommation | 43,0 W |
| Dimensions | 23 x 155 x 325 mm (l/h/p) (29/32 x 6 1/8 x 12 7/8 pouces) |
| Poids | 2,5 kg (5 livres 8 onces) (y compris les 4 plaquettes) |
| Température d'utilisation | De 5°C à 40°C (de 41°F à 104°F) |

### 1-3-2. Vidéo

| | |
|---|---|
| Largeur de bande | Plate à 5,0 MHz ±0,3 dB |
| Rapport signal/bruit | 53 dB |
| DG | Moins que 2 %(PAL) |
| DP | Moins que 2° (PAL) |
| Facteur K | Moins que 1 % |
| Fenêtre | 15 H (c-c) |
| Erreur résiduelle | PAL: à ±3 ns près<br>SECAM ou Monochrome: à ±15 ns |
| Retard Y/C | A 20 ns près |

### 1-3-3. Plage de réglage du processeur

| | |
|---|---|
| Niveau de sortie vidéo | ±3 dB |
| Niveau de saturation couleur | ±3 dB (PAL) |
| Niveau du noir | ±100 mV (PAL) |
| Phase de salve chroma | ±10° (PAL) |
| Phase de sous-porteuse système | Plus que 360° (PAL) |
| Phase de synchronisation système | De −1 à +3 μs |

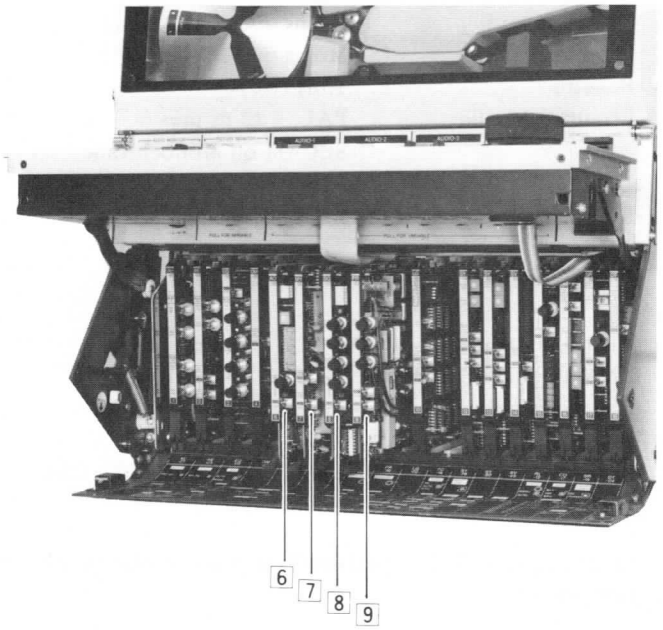
La conception et les spécifications peuvent être modifiées sans préavis.

## 1-4. INSTALLATION

### 1-4-1. Remarques relatives à l'installation

- Avant la mise en place des plaquettes, couper l'alimentation électrique.
- Installer correctement chacune des plaquettes dans la fente, en faisant correspondre leurs numéros respectifs, comme illustré ci-dessous.
- Avant la mise sous tension, vérifier une nouvelle fois que les plaquettes sont bien installées dans leur fente respective. **Une erreur dans ce domaine pourrait endommager les circuits.**

Ne pas retirer et installer les plaquettes sans nécessité.

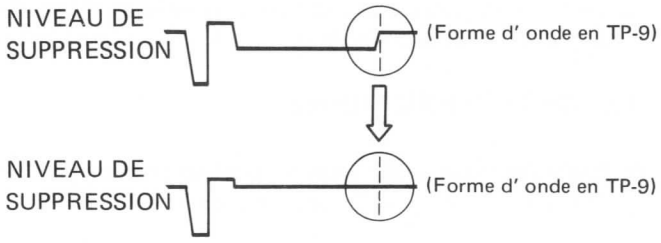



| | Numéro de plaquette | Nom de plaquette | |
|---|---|---|---|
| BKH-2350 | 6 | AD-22 | Convertisseur analogique/numérique (A/D CONVERTER) |
| | 7 | MY-26 | Mémoire (MEMORY) |
| | 8 | SG-17 | Générateur de synchronisation (SYNC GENERATOR) |
| | 9 | PR-63 | Processeur (PROCESSOR) |

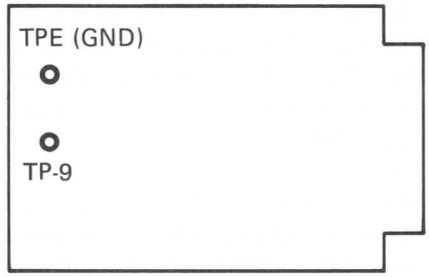
### 1-4-2. Réglages initiaux

**Réglage du décalage du niveau de suppression**

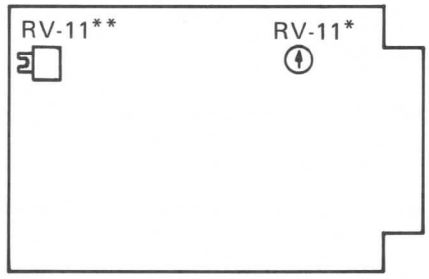
Ajuster le RV-11 sur la plaquette AD-22 de manière que la form d'onde en TP-9 sur la plaquette MY-26 soit comme illustré. (Sur un BKH-2350 avec un numéro de série de 10001 à 10250, le RV-11 ne pourra pas atteindre l'avant de la plaquette AD-22. Dans ce cas, retirer la plaquette AD-22 en utilisant une plaquette d'extension.)




**Plaquette MY-26**




**Plaquette AD-22**




*Sur un BKH-2350 à numéro de série de 10001 à 10250, le RV-11 est situé à l'endroit marqué d'un astérisque.

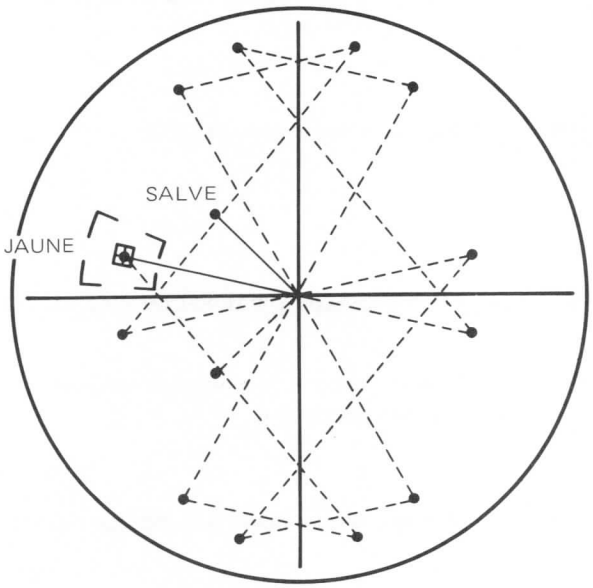
**Sur un BKH-2350 à numéro de série 10301 et au dessus, le RV-11 est situé à l'endroit marqué de deux astérisques.

**Préréglage de la phase de salve chroma (mode PAL uniquement)**

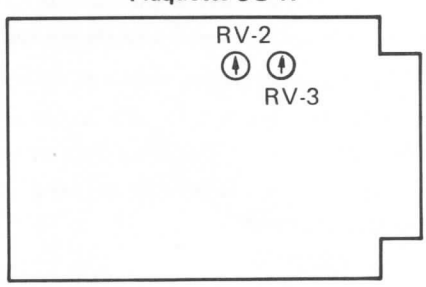
A l'emploi de l'unité de télécommande BK-2007 (en option), régler sur REMOTE le sélecteur REMOTE/LOCAL (S1) de la plaquette SG-17 et placer sur PRESET le sélecteur BURST-CHROMA de la télécommande BK-2007.

Si l'on ne fait pas appel à la BK-2007, régler sur LOCAL le sélecteur REMOTE/LOCAL (S1) de la plaquette SG-17 et tourner le réglage BURST-CHROMA de sorte que la sortie à la broche centrale du volume BURST-CHROMA devienne 0 V.

Ajuster ensuite le RV-3 de la plaquette SG-17 de sorte que la phase du signal de lecture à alignement dynamique (vitesse de bande: fixe) corresponde à celle du signal en lecture normale. Ajuster ensuite le RV-2 de la même plaquette, de sorte que la phase relative de la SALVE et du JAUNE soit comme illustrée ci-dessous sur le vectorscope.

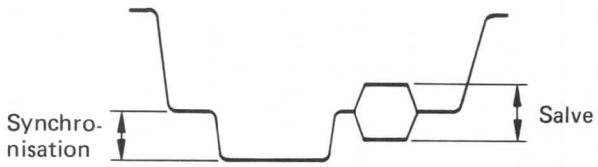



**Plaquette SG-17**



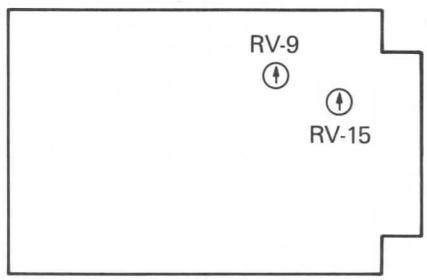

**Réglage de niveau de signaux de synchronisation et de salve**

Retirer la plaquette PR-63 à l'aide d'une plaquette d'extension. Ajuster le niveau des signaux de synchronisation et de salve pendant l'observation du signal vidéo de sortie du connecteur VIDEO-1 OUTPUT du BVH-2000PS/2180PS sur le moniteur de forme d'onde. Pour changer le niveau du signal de synchronisation, ajuster le RV-15 de la plaquette PR-63; pour changer le niveau du signal de salve, ajuster le RV-9 de la plaquette PR-63.



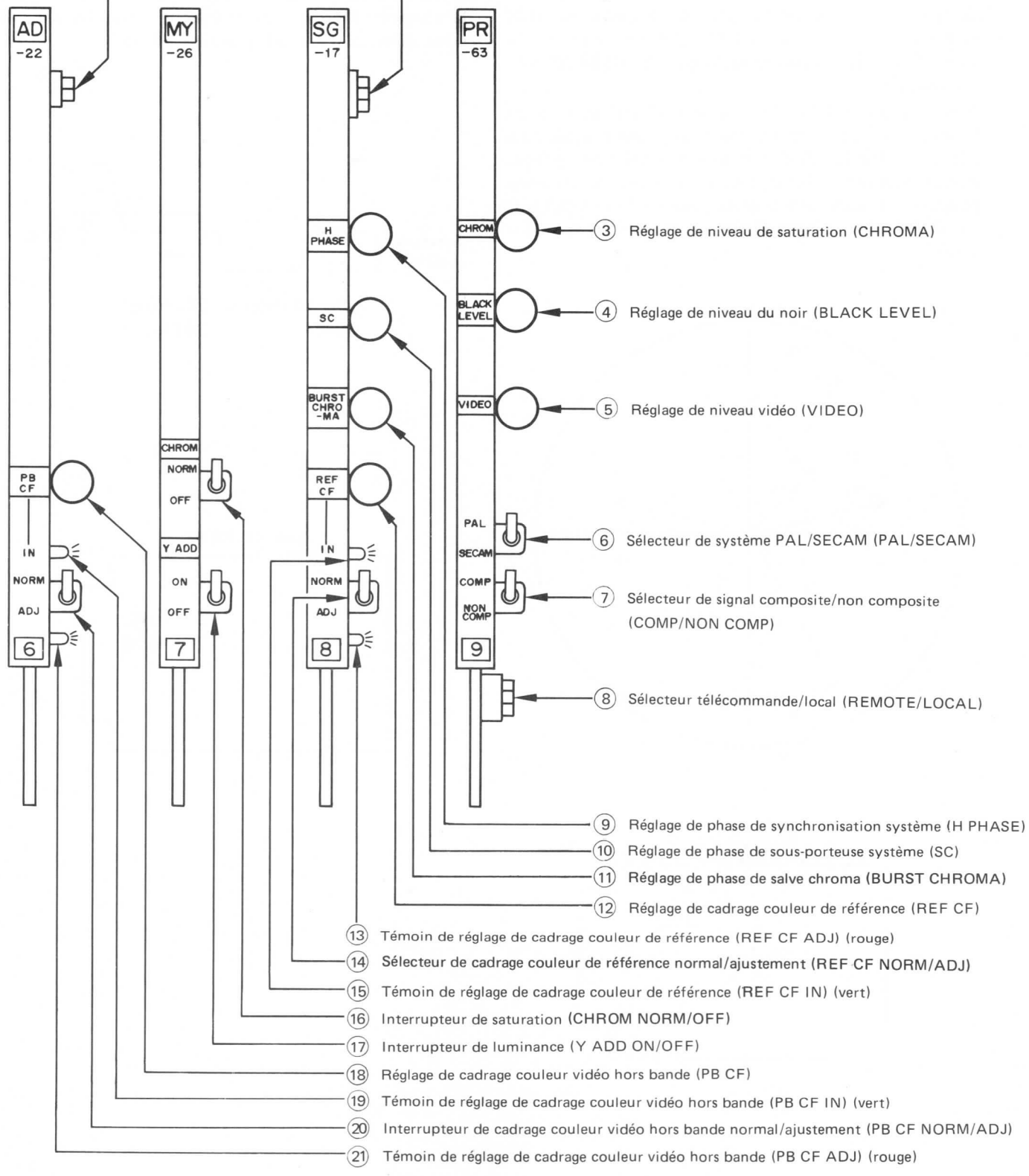

Synchronisation: 300 ± 6 mV
Salve : 300 ± 6 mV

**Plaquette PR-63**



## 1-5. EMPLACEMENT ET FONCTION DES ORGANES

### 1-5-1. Panneau avant


AD
-22
MY
-26
SG
-17
PR
-63
H PHASE
SC
BURST CHRO -MA
REF CF
CHROM
BLACK LEVEL
VIDEO
PAL
SECAM
COMP
NON COMP
PB CF
IN
NORM
ADJ
6
CHROM
NORM
OFF
Y ADD
ON
OFF
7
IN
NORM
ADJ
8
9
1 Sélecteur télécommande/local (REMOTE/LOCAL)
2 Sélecteur télécommande/local (REMOTE/LOCAL)
3 Réglage de niveau de saturation (CHROMA)
4 Réglage de niveau du noir (BLACK LEVEL)
5 Réglage de niveau vidéo (VIDEO)
6 Sélecteur de système PAL/SECAM (PAL/SECAM)
7 Sélecteur de signal composite/non composite (COMP/NON COMP)
8 Sélecteur télécommande/local (REMOTE/LOCAL)
9 Réglage de phase de synchronisation système (H PHASE)
10 Réglage de phase de sous-porteuse système (SC)
11 Réglage de phase de salve chroma (BURST CHROMA)
12 Réglage de cadrage couleur de référence (REF CF)
13 Témoin de réglage de cadrage couleur de référence (REF CF ADJ) (rouge)
14 Sélecteur de cadrage couleur de référence normal/ajustement (REF CF NORM/ADJ)
15 Témoin de réglage de cadrage couleur de référence (REF CF IN) (vert)
16 Interrupteur de saturation (CHROM NORM/OFF)
17 Interrupteur de luminance (Y ADD ON/OFF)
18 Réglage de cadrage couleur vidéo hors bande (PB CF)
19 Témoin de réglage de cadrage couleur vidéo hors bande (PB CF IN) (vert)
20 Interrupteur de cadrage couleur vidéo hors bande normal/ajustement (PB CF NORM/ADJ)
21 Témoin de réglage de cadrage couleur vidéo hors bande (PB CF ADJ) (rouge)

**① Sélecteur télécommande/local (REMOTE/LOCAL) (pour les commandes PB CF et PB CF NORM/ADJ)**

Le placer sur REMOTE à l'emploi d'une télécommande.

**Remarque:** Ces commandes doivent se trouver à la même position.

**② Sélecteur télécommande/local (REMOTE/LOCAL) (pour les réglages H PHASE, SC, BURST CHROMA)**

Le placer sur REMOTE à l'emploi d'une télécommande.

**③ Réglage de niveau de saturation (CHROMA)***

Le niveau peut être ajusté dans une plage de ±3 dB.

**④ Réglage de niveau du noir (BLACK LEVEL)***

Le niveau du noir peut être ajusté dans une plage allant de −100 mV à +100 mV.

**⑤ Réglage de niveau vidéo (VIDEO)**

Le niveau vidéo peut être réglé dans une plage de ±3 dB.

**⑥ Sélecteur de système PAL/SECAM (PAL/SECAM)**

Il permet de choisir entre les systèmes couleur PAL et SECAM.

**⑦ Sélecteur de signal composite/non composite (COMP/NON COMP)**

Le signal de sortie du connecteur VIDEO-3 OUTPUT du magnétoscope BVH-2000PS/2180PS est choisi: signal vidéo composite ou vidéo non composite.

**⑧ Sélecteur de télécommande/local (REMOTE/LOCAL) (pour réglages CHROMA, BLACK LEVEL, VIDEO)**

Le régler sur REMOTE à l'emploi d'une unité de télécommande.

**⑨ Réglage de phase de synchronisation système (H PHASE)**

La phase H du signal de lecture peut être ajustée pour correspondre à celle du signal vidéo de référence. La plage du réglage est de −1 à +3 μs.

**⑩ Réglage de phase de sous-porteuse système (SC)***

La phase de sous-porteuse du signal de lecture peut être ajustée pour correspondre à celle du signal vidéo de référence. La plage du réglage est de 360° et davantage.

**⑪ Réglage de phase de salve chroma (BURST CHROMA)***

La phase de salve chroma peut être ajustée dans une plage de ±10°

**⑫ Réglage de cadrage couleur de référence (REF CF)***

Il permet d'ajuster la phase SC-H signal vidéo de référence.

**⑬ Témoin de réglage de cadrage couleur de référence (REF CF ADJ) (rouge)***

Il s'allume pendant l'ajustement du cadrage couleur de référence.

**⑭ Sélecteur de cadrage couleur de référence normal/ajustement (REF CF NORM/ADJ)***

Pour ajuster le cadrage couleur de référence, régler ce sélecteur sur ADJ; dans les autres cas, le laisser sur NORMAL.

**⑮ Témoin de réglage de cadrage couleur de référence (REF CF IN) (vert)***

Il s'allume pour indiquer la phase SC-H optimale du signal vidéo de référence.

**⑯ Interrupteur de saturation (CHROMA NORM/OFF)**

Le laisser normalement sur NORM. A la position OFF, le signal de chrominance du signal vidéo est coupé.

**⑰ Interrupteur de luminance (Y ADD ON/OFF)**

A la position ON, un signal de luminance est ajouté par ligne pour maintenir la cocanalisation du signal de sortie quand la relation de trame est inversée au cours de la lecture à alignement dynamique.

A la position OFF, aucun signal de luminance n'est ajouté. Le signal vidéo n'est pas ajouté pendant la période de suppression verticale.

**⑱ Réglage de cadrage couleur vidéo hors bande (PB CF)***

La phase SC-H du signal vidéo hors bande peut être ajustée.

**⑲ Témoin de réglage de cadrage couleur vidéo hors bande (PB CF IN) (vert)***

Il s'allume pour indiquer la phase SC-H optimale du signal vidéo hors bande.

**⑳ Sélecteur de cadrage couleur vidéo hors bande normal/ajustement (PB CF NORM/ADJ)***

Pour ajuster le cadrage couleur du signal vidéo hors bande à l'aide du réglage PB CF, placer cet interrupteur sur ADJ. Le laisser sur NORM dans les autres cas.

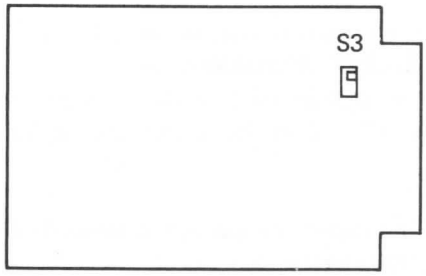
**㉑ Témoin de réglage de cadrage couleur vidéo hors bande (PB CF ADJ) (rouge)***

Il s'allume quand le cadrage couleur du signal vidéo hors bande est en cours d'ajustement.

* Les réglages, les sélecteurs et les témoins marqués d'un astérisque ne sont opérants que si le sélecteur PAL/SECAM ⑥ est réglé à la position PAL.

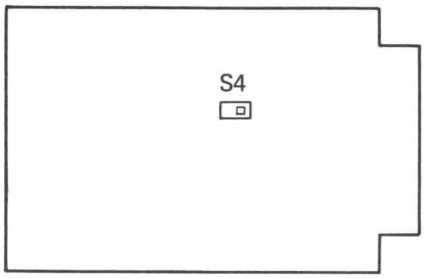
## 1-5-2. Sur les plaquettes

### Plaquette AD-22



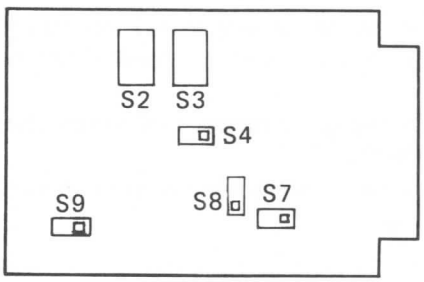

S3: A la position ON, le bruit n'est pas inclus au signal de sortie TBC si le témoin STANDBY s'éteint quand le sélecteur TAPE/EE du magnétoscope est réglé sur TAPE. A la position OFF, le signal DEMOD OUT comprenant le bruit est fourni.

### Plaquette MY-26




S4: Le compensateur de chute est mis en ou hors service. Veiller à le régler sur ON.

### Plaquette SG-17




S2: A la position ON (à droite), les lignes horizontales de 7 (320) à 14 (327) sont supprimées.
A la position OFF (à gauche), les lignes ne sont pas supprimées.

S3: A la position ON (à droite), les lignes horizontales de 15 (328) à 22 (335) sont supprimées.
A la position OFF (à gauche), les lignes ne sont pas supprimmées.

S4: A la position ON en mode SECAM, le signal V-ID est remplacé par le signal V-ID produit par le TBC.
A la position OFF, le signal n'est pas remplacé.
En mode PAL, cet interrupteur est inopérant.

S7: A la position ON, le signal de synchronisation du signal de sortie TBC est retardé de 4H par rapport au signal de référence dans le mode de prévisionnage, de sorte que la phase relative des signaux vidéo et de synchronisation soit la même.
A la position OFF, le signal de synchronisation du signal de sortie TBC est synchronisé au signal de référence, de sorte que le signal vidéo est déplacé de 2 à 6H verticalement.

S8: A la position ON, le signal de synchronisation du signal de sortie TBC est retardé de 4H par rapport au signal de référence en mode E à E, de sorte que la phase relative des signaux vidéo et de synchronisation soit la même.
A la position OFF, le signal de synchronisation du signal de sortie TBC est synchronisé au signal de référence, de sorte que le signal vidéo soit déplacé de 4H verticalement.

Le tableau ci-dessous illustre le fonctionnement d'après la position de chaque commande S7 et S8.
Quand les signaux vidéo et de synchronisation, qui sont retardés de 4H, sont surveillés sur un écran moniteur en mode de synchronisation interne, le déplacement vertical de l'image ne se produit pas en mode prévisionnage de sorte que l'on peut observer une image normale.

| Interrupteur | S7 | | S8 | |
|---|---|---|---|---|
| | ON | OFF | ON | OFF |
| PLAY (EDIT préréglé) | Les signaux vidéo et synchro sont retardés de 4H. | Le signal synchro est retardé de 0H et le signal vidéo l'est de 2 à 6H. | Aucun rapport | |
| E à E | Aucun rapport | | Les signaux vidéo et synchro sont retardés de 4H. | Le signal synchro est retardé de 0H et le signal vidéo l'est de 4H. |

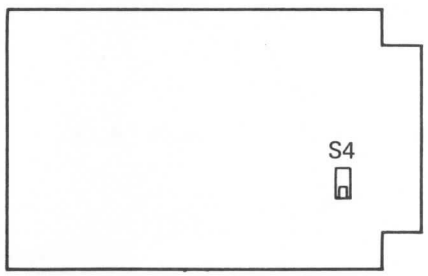
- Le degré de retard du signal de sortie TBC par rapport au signal de référence est indiqué.

S9: A la position ON, les lignes horizontales de 7 (320) à 22 (335) sont supprimées, quel que soit la position des commandes S2 et S3.
A la position OFF, la période de suppression est déterminée par les commandes S2 et S3.

**Remarque**

Lorsque l'interrupteur V-ID ON/OFF (S4) est réglé sur ON en mode SECAM, les lignes horizontales de 7 (320) à 15 (328) ne sont pas supprimées. La demi suppression H de la ligne horizontale 23 est toujours obtenue en mode PAL et jamais en mode SECAM.

**Plaquette PR-63**




S4: A la position ON, le signal de salve de référence est ajouté au signal de sortie TBC excepté quand le signal de référence servo ne comporte pas le signal de salve.
A la position OFF, le signal de salve n'est pas ajouté.

## 1-6. REGLAGES

Les réglages suivants ne s'appliquent qu'au système couleur PAL; ils peuvent donc être ignorés dans le cas d'un signal SECAM.

**Réglage du cadrage couleur (phase SC-H optimale) du signal de référence**

| Fonctionnement | Remarques |
|---|---|
| Connecter le signal de référence. | |
| ↓ | |
| Ajuster le réglage H PHASE et le réglage SC. | |
| ↓ | |
| Régler le sélecteur REF CF NORM/ ADJ (14) sur ADJ. | Le réglage commence et le témoin REF CF ADJ (rouge) (13) s'allume au cours de celui-ci. |
| ↓ | |
| Tourner le réglage REF CF (12) de sorte que s'allume le témoin REF CF IN (vert) (15). | La phase SC-H du signal de référence peut être ajustée à la valeur optimale. |
| ↓ | |
| Placer le sélecteur REF CF NORM/ ADJ sur NORM. | Le réglage est maintenant terminé et le témoin REF CF ADJ s'éteint. |

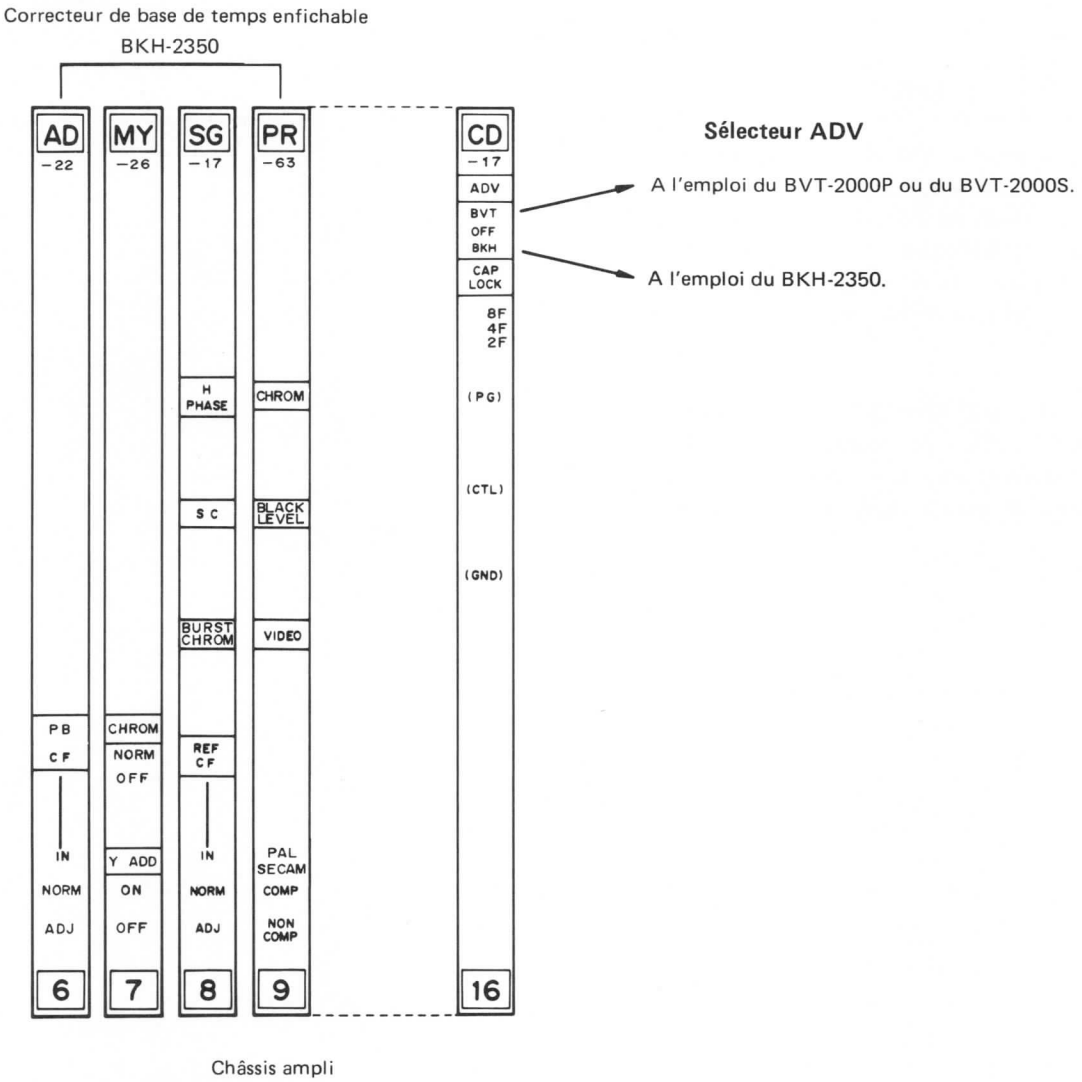
**Réglage du cadrage couleur (phase SC-H optimale) du signal vidéo hors bande**

| Fonctionnement | Remarques |
|---|---|
| Reproduire la bande à vitesse normale en marche avant. | |
| ↓ | |
| Placer le sélecteur PB CF NORM/ADJ (20) sur ADJ. | Le réglage commence et le témoin PB CF ADJ (rouge) (21) s'allume pendant celui-ci. |
| ↓ | |
| Tourner le réglage PB CF (18) de sorte que le témoin PB CF IN (19) s'allume. | La phase SC-H du signal vidéo hors bande peut être ajustée à la valeur optimale. |
| ↓ | |
| Placer le sélecteur PB CF NORM/ADJ sur NORM. | Le réglage est ainsi terminé et le témoin PB CF ADJ s'éteint. |

## 1-7. EXPLOITATION

**Sélection de l'avance de phase**

Sur la plaquette CD-17 du magnétoscope BVH-2000PS/2180PS, régler sur BKH le sélecteur ADV.



**Réglage du sélecteur REMOTE/LOCAL**

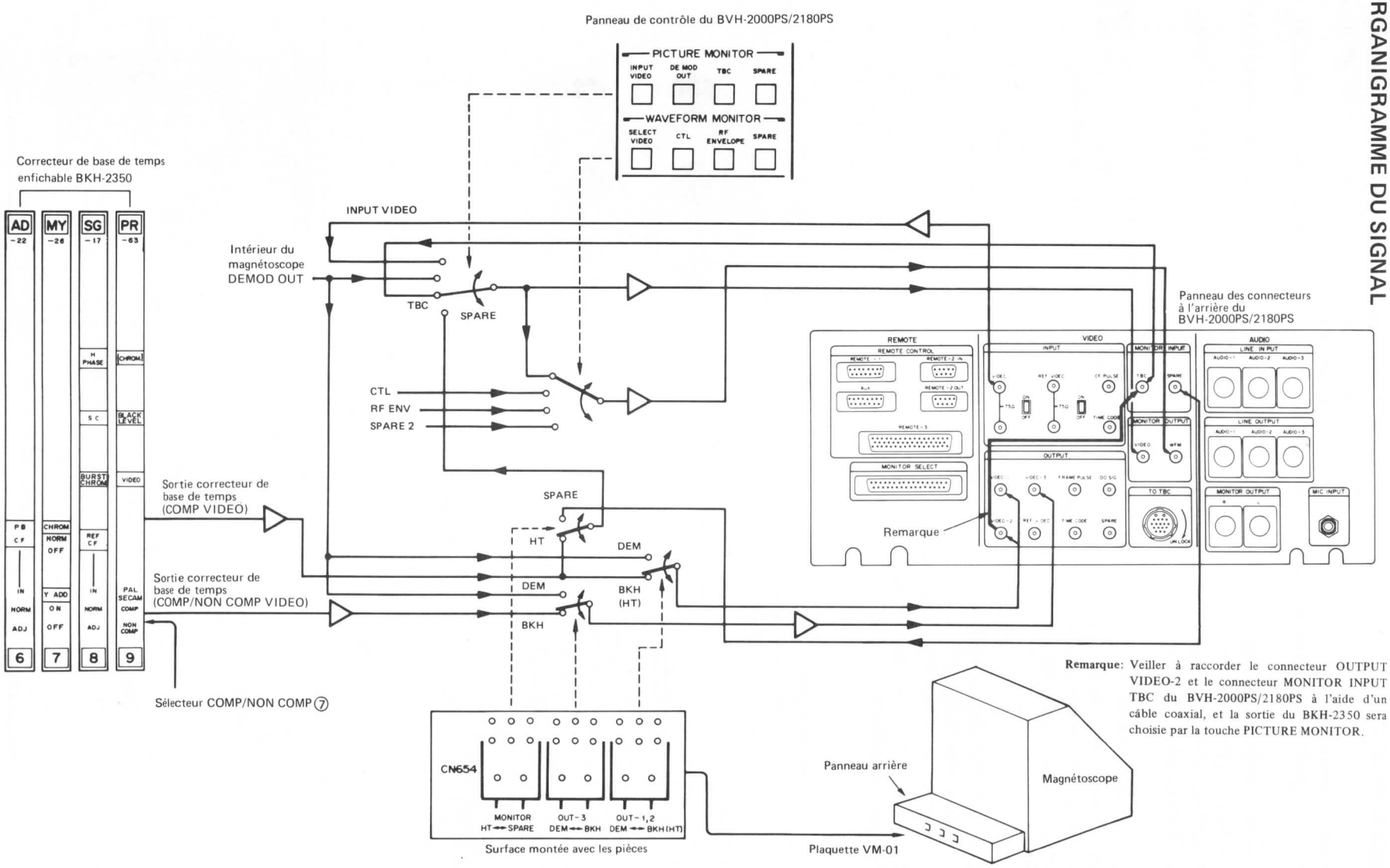
Sur les plaquettes SG-17, AD-22 et PR-63, régler sur LOCAL les sélecteurs REMOTE/LOCAL.

**Sélection de la sortie de correcteur de base de temps**

| SORTIE | Sélecteur OUT-3 DEM ⟷ BKH sur la plaquette VM-01 | Sélecteur OUT-1, 2 DEM ⟷ BKH (HT) sur la plaquette VM-01 | Sélecteur PICTURE MONITOR sur le magnétoscope | Sélecteur WAVEFORM MONITOR sur le magnétoscope |
|---|---|---|---|---|
| MONITOR VIDEO** | | BKH | TBC | |
| MONITOR WFM** | | BKH | TBC | SELECT VIDEO |
| VIDEO-1, VIDEO-2 | | BKH | | |
| VIDEO-3 | BKH* | | | |

* Lorsque, sur la plaquette VM-01 du magnétoscope BVH-2000PS/2180PS, le sélecteur OUT-3 est réglé sur BKH, le signal de sortie du BKH-2350 est alimenté à partir du connecteur VIDEO-3. Le sélecteur COMP/NON COMP de la plaquette PR-63 détermine le signal de sortie du connecteur VIDEO-3: signal composite ou non composite.

** Le connecteur OUTPUT VIDEO-2 et le connecteur MONITOR INPUT TBC du magnétoscope BVH-2000PS/2180PS doivent être raccordés à l'aide d'un câble coaxial; faute de quoi le signal de sortie ne peut être obtenu.




**Remarque:** Veiller à raccorder le connecteur OUTPUT VIDEO-2 et le connecteur MONITOR INPUT TBC du BVH-2000PS/2180PS à l'aide d'un câble coaxial, et la sortie du BKH-2350 sera choisie par la touche PICTURE MONITOR.

## 1-9. TELECOMMANDE

Une télécommande est possible dans les cas suivants:

- A l'emploi de l'unité de télécommande BK-2007 (en option).
- Quand le BVH-2000PS est installé dans la console SU-910 avec la SUA-911 (pont de moniteur).
- Quand le BVH-2180PS est installé dans une console SU-950 ou SU-960, avec la SUA-951.

Les paramètres suivants peuvent être contrôlés à distance: Niveau vidéo, niveau du noir, niveau de saturation, phase de salve chroma, phase de sous-porteuse système, phase de synchronisation système, réglage de cadrage couleur vidéo hors bande*.

* Le réglage de cadrage couleur vidéo hors bande peut être contrôlé à distance par la SUA-951 ou par la SUA-911 dont le numéro de série est 30000 ou supérieur. La SUA-911 dont le numéro de série est inférieur et la BK-2007 ne sont pas utilisables à cette fin.

### Positionnement des sélecteurs

Pour la télécommande, positionner les sélecteurs de la façon suivante:

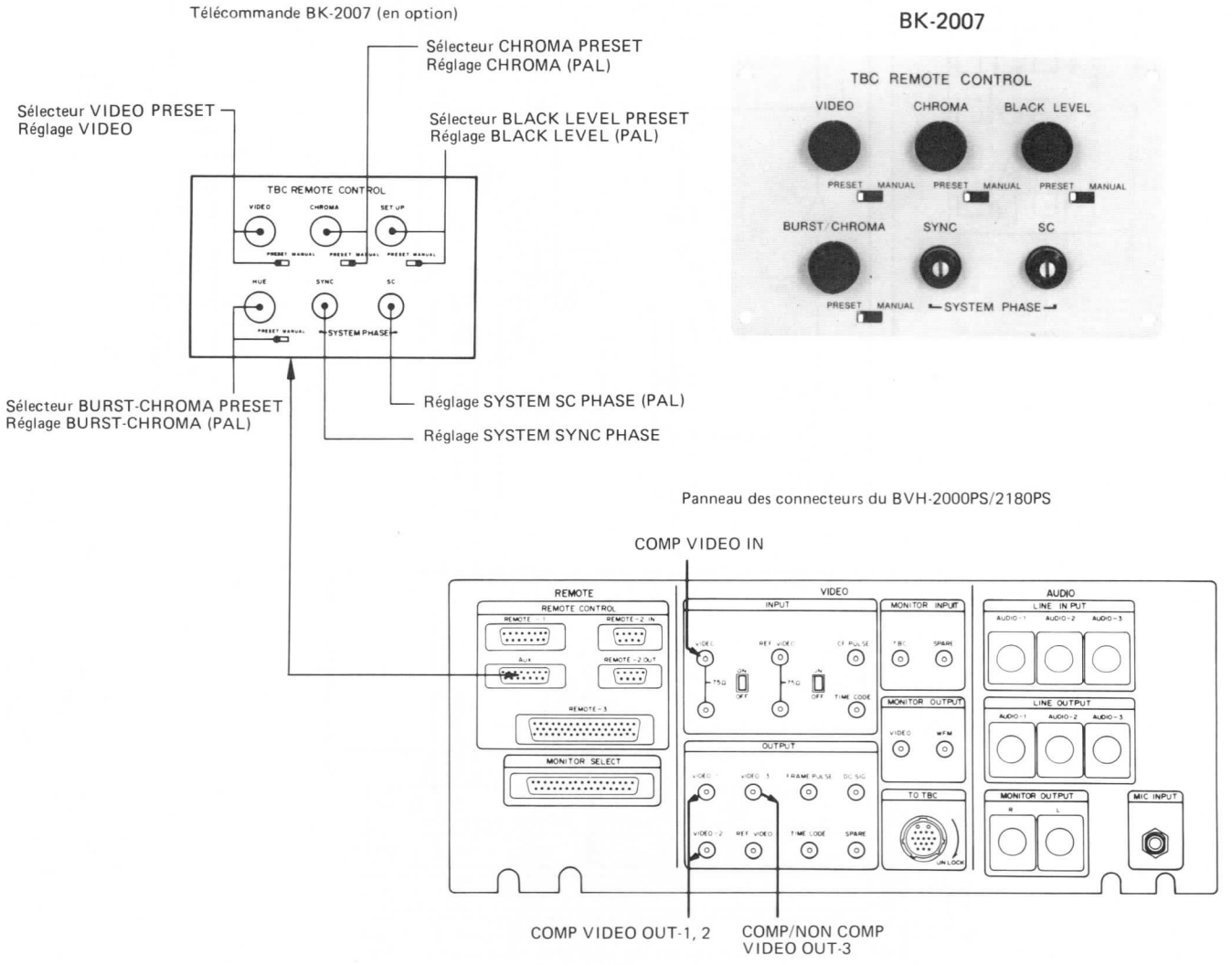
plaquette AD-22: sélecteur REMOTE/LOCAL ①* sur REMOTE

plaquette SG-17: sélecteur REMOTE/LOCAL ② sur REMOTE

plaquette PR-63: sélecteur REMOTE/LOCAL ⑧ sur REMOTE

* Le sélecteur REMOTE/LOCAL ① de la plaquette AD-22 ne doit être mis sur REMOTE que lorsque le réglage PB CF ADJ peut être contrôlé à distance.

### Connexions



# TEIL 1

# BETRIEB

## 1-1. ALLGEMEINES

Bei dem BKH-2350 handelt es sich um einen steckbaren Time-Base-Corrector, der aus vier Leiterplatten besteht und für die Sony 1-Zoll Videorecorder BVH-2000PS*/2180PS bestimmt ist. Der Time-Base-Corrector ist so ausgelegt, daß er in das Elektronik-Gestell des BVH-2000PS*/2180PS eingesetzt werden kann. Zeitbasisfehler werden über einen weiten Bereich ausgeglichen, so daß man bei normaler Wiedergabegeschwindigkeit eine sehr hohe Bildqualität und bei −1 bis +3facher Normalgeschwindigkeit eine Wiedergabe mit dynamischer Spurlage erhält.

## 1-2. BESONDERE MERKMALE

- Am eingebauten Schalter kann zwischen PAL und SECAM-Farbsystem umgeschaltet werden.
- Zeitfehlerkompensation durch Annäherungskurve liefert hochqualitatives Wiedergabebild (nur bei PAL-Betrieb).
- Eingebauter Drop-Out-Kompensator mit einem Korrekturfenster von 1 H für das Y-Signal und 2 H für das C-Signal. Bei SECAM-Betrieb wird das C-Signal durch eine um 2 H vor der Zeile, in der ein Drop-Out aufgetreten ist, liegende Zeile ersetzt.
- An den Schaltern S2 und S3 der SG-17-Leiterplatte kann von der siebten zur zweiundzwanzigsten Horizontalzeile der V-Austastlücke unabhängig ein- und ausgeschaltet werden.
- Im Shuttle-Betrieb erhält man bis zur 5fachen Normalgeschwindigkeit ein stabiles Schwarzweißbild.
- Fernbedienmöglichkeit von externem Gerät.
- Wiedergabe-Abtastung 8 Bit x 4 $f_{HT}$.
- Der Chrominanzanteil des Videosignals kann am Schalter S1 der MY-26-Leiterplatte ausgeschaltet werden.

* Beim Einsetzen des BKH-2350 in den BVH-2000PS muß darauf geachtet werden, daß der BVH-2000PS eine Serien- Nr. von 33401 oder höher aufweist. Ein BVH-2000PS mit niedrigerer Serien-Nr. kann nicht verwendet werden.

## 1-3. TECHNISCHE DATEN

### 1-3-1. Allgemeines

| | |
|---|---|
| Leistungsaufnahme | 43,0 W |
| Abmessungen | 23 x 155 x 325 mm (B/H/T) |
| Gewicht | 2,5 kg (einschließlich 4 Leiterplatten) |
| Betriebstemperatur | 5°C bis 40°C |

### 1-3-2. Video

| | |
|---|---|
| Bandbreite | Glatt bis 5,0 MHz ±3 dB |
| Signal-Rauschabstand | 53 dB |
| Differentialgewinn | Weniger als 2% (PAL) |
| Differentialphase | Weniger als 2° (PAL) |
| K-Faktor | Weniger als 1% |
| Fenster | 15 Hss |
| Restfehler | PAL: innerhalb ±3 ns<br>SECAM oder Schwarzweiß: innerhalb ±15 ns |
| Y/C-Verzögerung | Weniger als 20 ns |

### 1-3-3. Prozessor-Einstellbereich

| | |
|---|---|
| Video-Ausgangspegel | ±3 dB |
| Chromapegel | ±3 dB (PAL) |
| Schwarzpegel | ±100 mV (PAL) |
| Burst-Chroma-Phase | ±10° (PAL) |
| System-HT-Phase | Mehr als 360° (PAL) |
| System-Sync-Phase | −1 bis +3 μs |

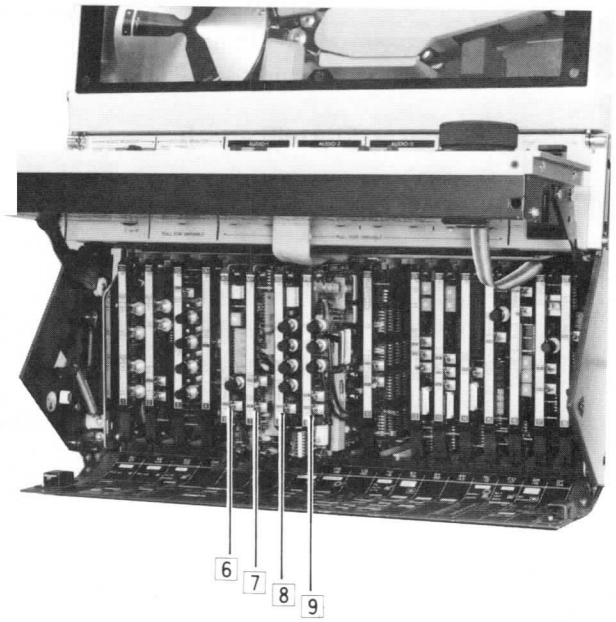
Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.

## 1-4. EINBAU

### 1-4-1. Einbauhinweise

- Schalten Sie das Gerät vor dem Einsetzen der Leiterplatten aus.
- Achten Sie beim Einsetzen darauf, daß die Nummern der Leiterplatten und der Schlitze wie unten gezeigt miteinander übereinstimmen.
- Überprüfen Sie vor dem Einschalten noch einmal, ob die Leiterplatten in die richtigen Schlitze gesteckt sind. In falsche Schlitze eingesteckte Leiterplatten können beim Einschalten beschädigt werden.

Nehmen Sie die Leiterplatten nur heraus, wenn es unbedingt erforderlich ist.

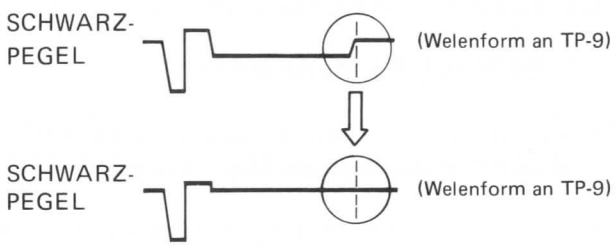


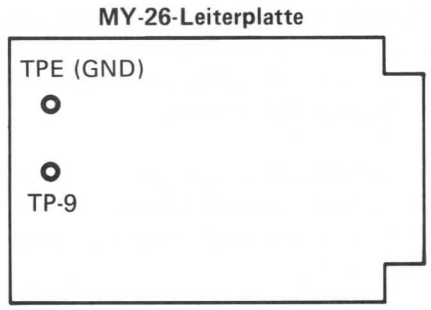

| | Leiterplatten Nr. | Bezeichnung | |
|---|---|---|---|
| BKH-2350 | 6 | AD-22 | A/D KONVERTER |
| | 7 | MY-26 | MEMORY |
| | 8 | SG-17 | SYNC GENERATOR |
| | 9 | PR-63 | PROZESSOR |

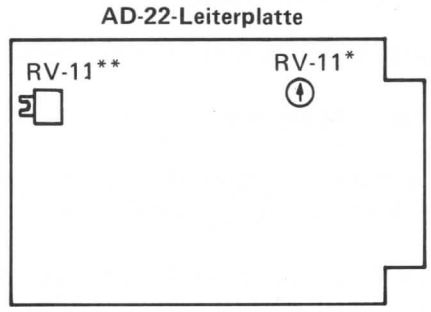
### 1-4-2. Voreinstellungen

**Schwarzpegel-Voreinstellung**

Stellen Sie RV-11 der AD-22-Leiterplatte so ein, daß sich an TP-9 der MY-26-Leiterplatte folgenden Wellenform ergibt. (Beim BKH-2350 mit einer Seriennummer zwischen 10001 und 10250 ist der Regler RV-11 nicht von der Vorderseite der AD-22-Leiterplatte zugänglich. Ziehen Sie in diesem Fall die AD-22-Leiterplatte heraus und verwenden Sie eine Verlängerungsplatte.)




*Beim BKH-2350 einer Seriennummer zwischen 10001 und 10250 liegt der Regler RV-11 an der mit einem Stern markierten Stelle.

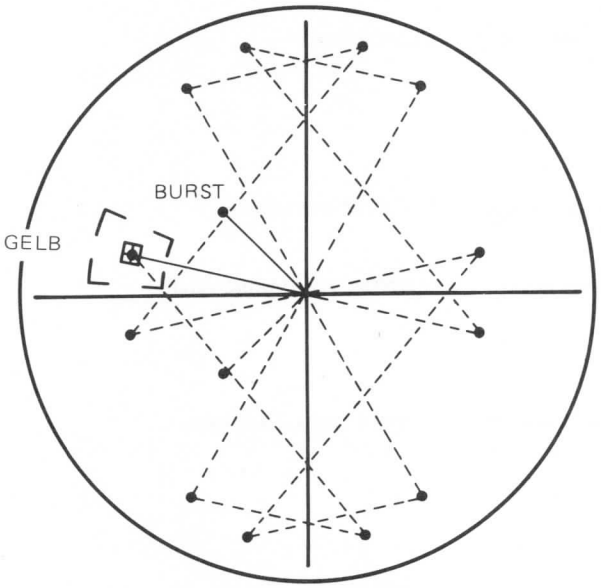
**Beim BKH-2350 mit einer Seriennummer über 10301 liegt der Regler an der mit zwei Sternen markierten Stelle.

**Burst-Chroma-Phasen-Voreinstellung (nur bei PAL-Betrieb)**

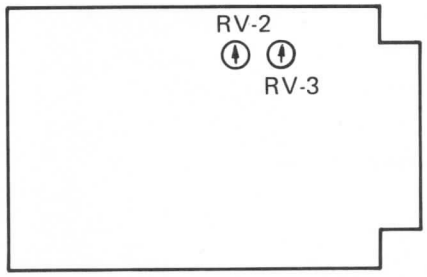
Stellen Sie bei Verwendung des Fernbedienfeldes BK-2007 (Sonderzubehör) den REMOTE/LOCAL-Schalter (S1) auf der SG-17-Leiterplatte auf REMOTE und den BURST-CHROMA-Schalter des Fernbedienfeldes BK-2007 auf PRESET.

Wird das BK-2007 nicht verwendet, so stellen Sie den REMOTE/LOCAL-Schalter (S1) auf der SG-17-Leiterplatte auf LOCAL und stellen Sie den BURST-CHROMA-Regler so ein, daß am mittleren Anschluß des BURST-CHROMA-Reglers 0 V anliegen. Stellen Sie den Regler RV-3 der SG-17-Leiterplatte so ein, daß die Chroma-Phase des Dynamic-Tracking-Wiedergabesignals (Bandgeschwindigkeit: Standbild) mit der Phase des normalen Wiedergabesignals übereinstimmt. Stellen Sie dann den Regler RV-2 derselben Leiterplatte so ein, daß sich auf dem Vektorskop zwischen BURST und GELB die unten gezeigte relative Phase ergibt.

- Benutzen Sie zur Einstellung das Band, auf dem ein Farbbalkensignal aufgenommen ist.

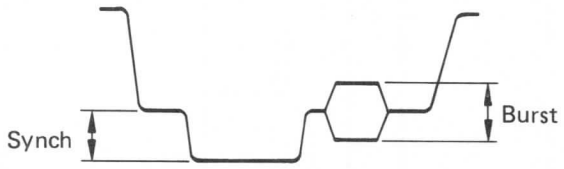



**SG-17-Leiterplatte**



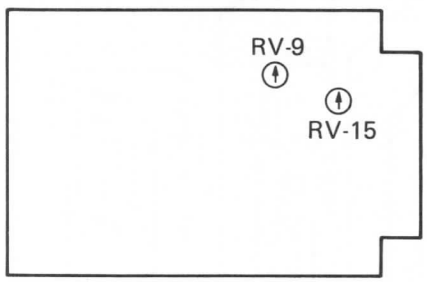

**Synch- und Burst-Pegeleinstellung**

Ziehen Sie die PR-63-Leiterplatte heraus und verwenden Sie die Verlängerungsplatte. Unter Beobachtung des Videoausgangssignals des VIDEO-1 OUTPUT-Anschlusses auf einem Wellenformmonitor stellen Sie dann den Synch-Pegel an RV-15 und den Burst-Pegel an RV-9 der PR-63-Leiterplatte ein.



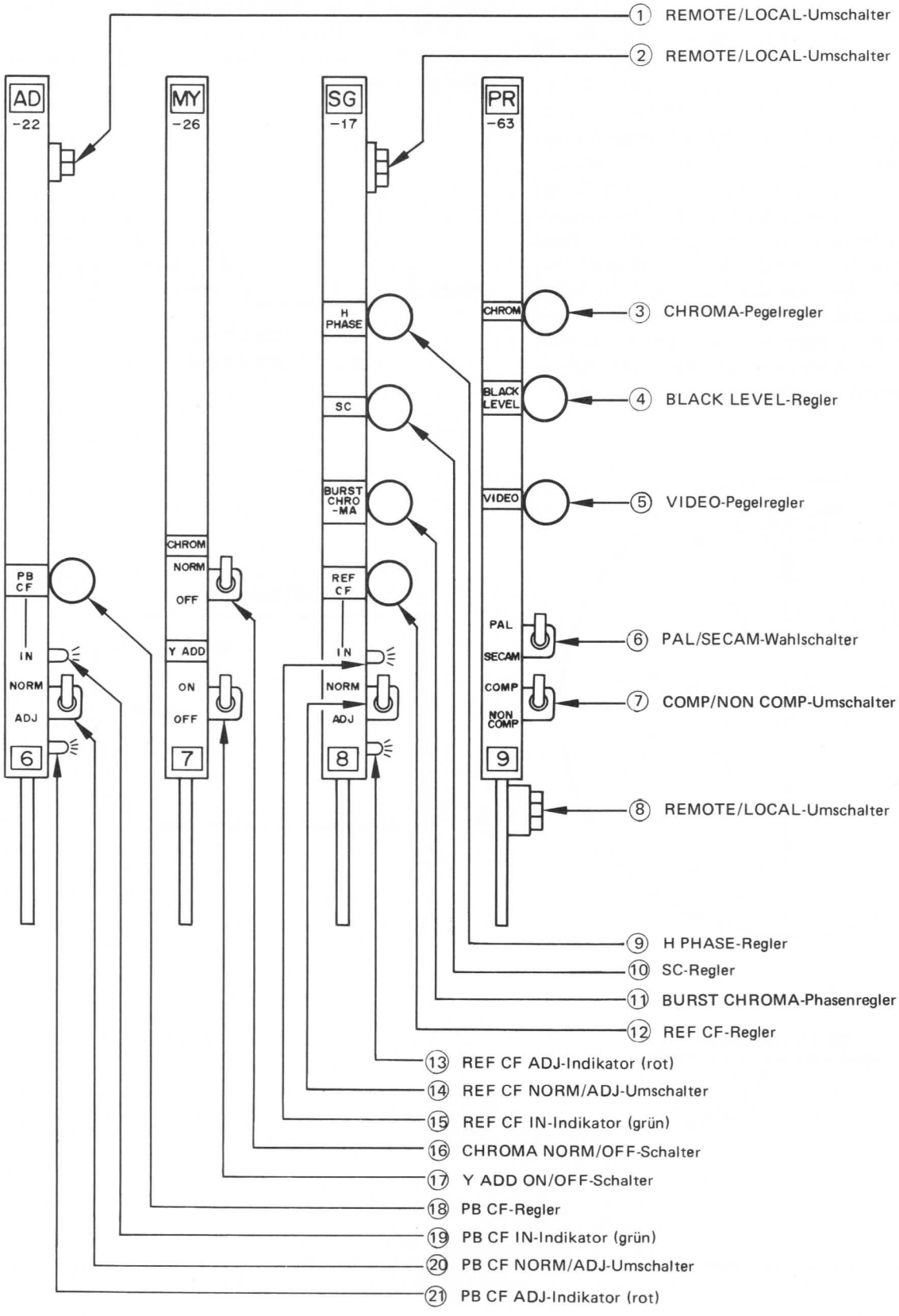

Synch: 300 ± 6 mV
Burst: 300 ± 6 mV

**PR-63-Leiterplatte**



## 1-5. LAGE UND FUNKTION DER TEILE

### 1-5-1. Vorderseite



**① Fernbedien/Direkt-Umschalter (REMOTE/LOCAL) (für PB CF- und PB CF NORM/ADJ-Schalter)**

Stellen Sie diesen Schalter bei Verwendung des Fernbedienfeldes auf REMOTE.

**Hinweis:** Diese Schalter müssen auf dieselbe Position gestellt werden.

**② Fernbedien/Direkt-Umschalter (REMOTE/LOCAL) (für H PHASE, SC, BURST CHROMA)**

Stellen Sie diesen Schalter bei Verwendung des Fernbedienfeldes auf REMOTE.

**③ Chromapegelregler (CHROMA)***

Der Chromapegel kann hier in einem Bereich von ±3 dB eingestellt werden.

**④ Schwarzpegelregler (BLACK LEVEL)***

Der Schwarzpegel kann hier in einem Bereich von −100 mV bis + 100 mV eingestellt werden.

**⑤ Videopegelregler (VIDEO)**

Der Videopegel kann hier in einem Bereich von ±3 dB eingestellt werden.

**⑥ PAL/SECAM-Wahlschalter**

Zur Wahl zwischen PAL- und SECAM-Farbsystem.

**⑦ FBAS/FBA-Umschalter (COMP/NON COMP)**

Das am VIDEO-3 OUTPUT-Anschluß des BVH-2000PS/2180PS anliegende Signal kann hier zwischen FBAS und FBA umgeschaltet werden.

**⑧ Fernbedien/Direkt-Umschalter (für CHROMA, BLACK LEVEL, VIDEO)**

Stellen Sie diesen Schalter bei Verwendung des Fernbedienfeldes auf REMOTE.

**⑨ Regler für System-Sync-Phase (H PHASE)**

Die H-Phase des Wiedergabesignals kann hier in einem Bereich von −1 bis +3 μs an das Referenz-Videosignal angepaßt werden.

**⑩ Regler für System-Hilfsträger-Phase (SC)***

Die Hilfsträger-Phase kann hier in einem Bereich von über 360° an die Phase des Referenz-Videosignals angepaßt werden.

**⑪ Regler für Burst-Chroma-Phase (BURST CHROMA)***

Die Burst-Chroma-Phase kann hier in einem Bereich von ±10° eingestellt werden.

**⑫ Regler für halbbildrichtige Farbträgerverkopplung des Referenzsignals (REF CF)***

Zur Einstellung der Hilfsträger-H-Phase des Referenz-Videosignals.

**⑬ Indikator (rot) zur Einstellung der halbbildrichtigen Farbträgerverkopplung des Referenzsignals (REF CF ADJ)***

Dieser Indikator leuchtet während der Einstellung der halbbildrichtigen Farbträgerverkopplung des Referenzsignals.

**⑭ Normal/Justier-Umschalter für Referenzsignal (REF CF NORM/ADJ)***

Zur Einstellung der halbbildrichtigen Farbträgerverkopplung des Referenzsignals stellen Sie diesen Schalter auf ADJ. Sonst lassen Sie ihn auf NORMAL stehen.

**⑮ Indikator (grün) für optimale halbbildrichtige Farbträgerverkopplung des Referenzsignals (REF CF IN)***

Dieser Indikator zeigt die optimale Hilfsträger-H-Phase des Referenz-Videosignals an.

**⑯ Chromapegel-Normal/Aus-Schalter (CHROMA NORM/OFF)**

Lassen Sie den Schalter normalerweise auf NORM stehen. In der Position OFF ist der Chrominanzanteil des Videosignals ausgeschaltet.

**⑰ Helligkeitssignal-Ein/Aus-Schalter (Y ADD ON/OFF)**

In der Position ON wird zeilenweise ein Helligkeitssignal hinzugefügt, um den Zeilensprung des Ausgangssignals beizubehalten, wenn die Beziehung zwischen den Halbbildern während Dynamic-Tracking-Wiedergabe umgekehrt ist.

In Position OFF wird kein Helligkeitssignal hinzugefügt. Während der Vertikal-Austastphase wird kein Videosignal hinzugefügt.

**⑱ Regler für halbbildrichtige Farbträgerverkopplung von Band (PB CF)***

Zur Einstellung der Hilfsträger-H-Phase des von Band wiedergegebenen Videosignals.

**⑲ Indikator (grün) für optimale halbbildrichtige Farbträgerverkopplung von Band (PB CF IN)***

Dieser Indikator zeigt die optimale Hilfsträger-H-Phase des von Band wiedergagebenen Videosignals an.

**⑳ Normal/Justier-Umschalter für halbbildrichtige Farbträgerverkopplung von Band (PB CF NORM/ADJ)***

Zur Einstellung der halbbildrichtigen Farbträgerverkopplung von Band mit dem PB CF-Regler ist dieser Schalter auf ADJ und ansonsten auf NORM zu stellen.

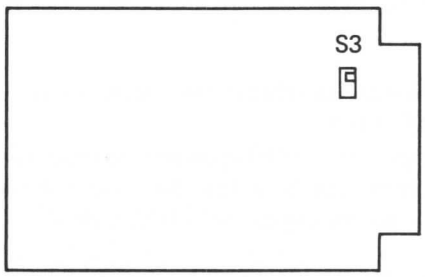
**㉑ Indikator (rot) zur Einstellung der halbbildrichtigen Farbträgerverkopplung von Band (PB CF ADJ)***

Dieser Indikator leuchtet während der Einstellung der halbbildrichtigen Verkopplung des Videosignals von Band.

* Diese Regler, Schalter und Indikatoren arbeiten nur, wenn der PAL/SECAM-Wahlschalter ⑥ auf PAL gestellt ist.

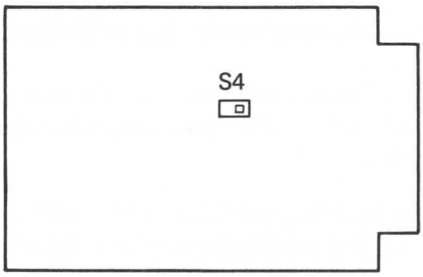
## 1-5-2. Schalter auf den Leiterplatten

**AD-22-Leiterplatte**



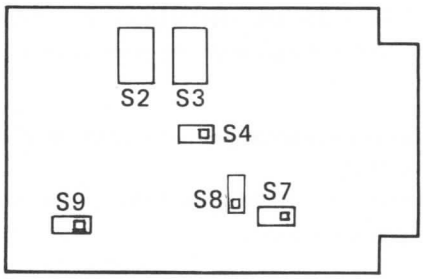

S3: In position ON ist das Störgeräusch nicht im TBC-Ausgangssignal enthalten, wenn die STANDBY-Lampe bei Einstellen des TAPE/EE-Wählers am Videorecorder auf TAPE erlischt. In der Position OFF liegt am Ausgang das DEMOD OUT-Signal einschließlich des Störgeräuschs an.

**MY-26-Leiterplatte**




S4: Der Drop-Out-Kompensator wird ein- und ausgeschaltet. Vergewissern Sie sich, daß der Schalter auf ON steht.

**SG-17-Leiterplatte**




S2: In Position ON (rechts) werden die Horizontalzeilen 7 (320) bis 14 (327) dunkelgesteuert.
In Position OFF (links) werden die Zeilen nicht dunkelgesteuert.

S3: In Position ON (rechts) werden die Horizontalzeilen 15 (328) bis 22 (335) dunkelgesteuert.
In Position OFF (links) werden die Zeilen nicht dunkelgesteuert.

S4: Bei SECAM-Betrieb wird bei Position ON das V-ID-Signal durch das vom TBC erzeugten V-ID-Signal ersetzt.
In Position OFF wird das Signal nicht ersetzt.
Bei PAL-Betrieb hat dieser Schalter keine Funktion.

S7: In Position ON wird das Synchronsignal des TBC-Ausgangssignals um 4 H bezüglich des Referenzsignals bei Vorschau-Betrieb verzögert, so daß die relative Phase der Video- und Synchronsignale gleich ist.
In Position OFF wird das Synchronsignal des TBC-Ausgangssignals mit dem Referenzsignal synchronisiert, so daß das Videosignal um 2 bis 6 H vertikal verschoben ist.

S8: In Position ON wird das Synchronsignal des TBC-Ausgangssignals um 4 H bezüglich des Referenzsignals bei E-zu-E-Betrieb verzögert, so daß die relative Phase des Video- und Synchronsignals gleich ist.
In Position OFF wird das Synchronsignal des TBC-Ausgangssignals mit dem Referenzsignal synchronisiert, so daß das Videosignal um 4 H vertikal verschoben ist.

Die Wirkung der Schalterpositionen von S7 und S8 ist unten gezeigt.
Wenn die Video- und Synchronsignale, die um 4 H verzögert werden, auf einem Monitor bei interner Synchronisierung betrachtet werden, tritt eine vertikale Bildverschiebung bei Vorschau-Betrieb nicht auf, so daß ein normales Bild betrachtet werden kann.



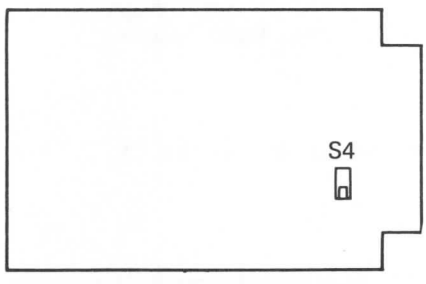
| Schalter | S7 | | S8 | |
|---|---|---|---|---|
| | ON | OFF | ON | OFF |
| PLAY (EDIT-Voreinstellung) | Synchron- und Videosignale werden um 4 H verzögert. | Das Synchronsignal wird um 0 H, das Videosignal um 2 bis 6 H verzögert. | Kein Einfluß | |
| E-zu-E | Kein Einfluß | | Synchron- und Videosignale werden um 4 H verzögert. | Das Synchronsignal wird um 0 H, das Videosignal um 4H verzögert. |

- Die Verzögerung des TBC-Ausgangssignals gegenüber dem Referenzsignal wird gezeigt.

S9: In Position ON werden die Horizontalzeilen 7 (320) bis 22 (335) unabhängig von der Position der Schalter S2 und S3 dunkelgesteuert.
In Position OFF wird die Austastphase durch die Schalter S2 und S3 bestimmt.

**Hinweis**
Wenn der V-ID ON/OFF-Schalter (S4) in der SECAM-Betriebsart auf ON gestellt ist, werden die Horizontalzeilen 7 (320) bis 15 (328) nicht dunkelgesteuert. Die halbe H-Austastung der Horizontalzeile 23 erfolgt im PAL-Betrieb immer, bei SECAM-Betrieb aber nicht.

**PR-63-Leiterplatte**




S4: In Position ON wird das Farbburstsignal dem TBC-Ausgangssignal hinzugefügt, außer wenn das Servo-Referenzsignal kein Farbburstsignal enthält.
In Position OFF wird das Farbburstsignal nicht hinzugefügt.

## 1-6. EINSTELLUNGEN

Die folgenden Einstellungen sind nur für das PAL-Farbsystem erforderlich. Beim SECAM-System sind diese Punkte zu überspringen.

**Einstellung der halbbildrichtigen Farbträgerverkopplung (optimale Hilfsträger-H-Phase) des Referenzsignals**

| Bedienung | Bemerkungen |
|---|---|
| Referenzsignal anschließen. | |
| H PHASE- und SC-Regler einstellen. | |
| REF CF NORM/ADJ-Umschalter ⑭ auf ADJ stellen. | Der Einstellvorgang kann beginnen. Während des Einstellvorgangs leuchtet der rote REF CF ADJ-Indikator ⑬. |
| REF CF ADJ-Regler ⑫ so einstellen, daß der grüne REF CF IN-Indikator ⑮ aufleuchtet. | Die Hilfsträger-H-Phase des Referenzsignals wird auf diese Weise optimal eingestellt. |
| REF CF NORM/ADJ-Umschalter auf NORM zurückstellen. | Der Einstellvorgang ist beendet und der REF CF ADJ-Indikator erlischt. |

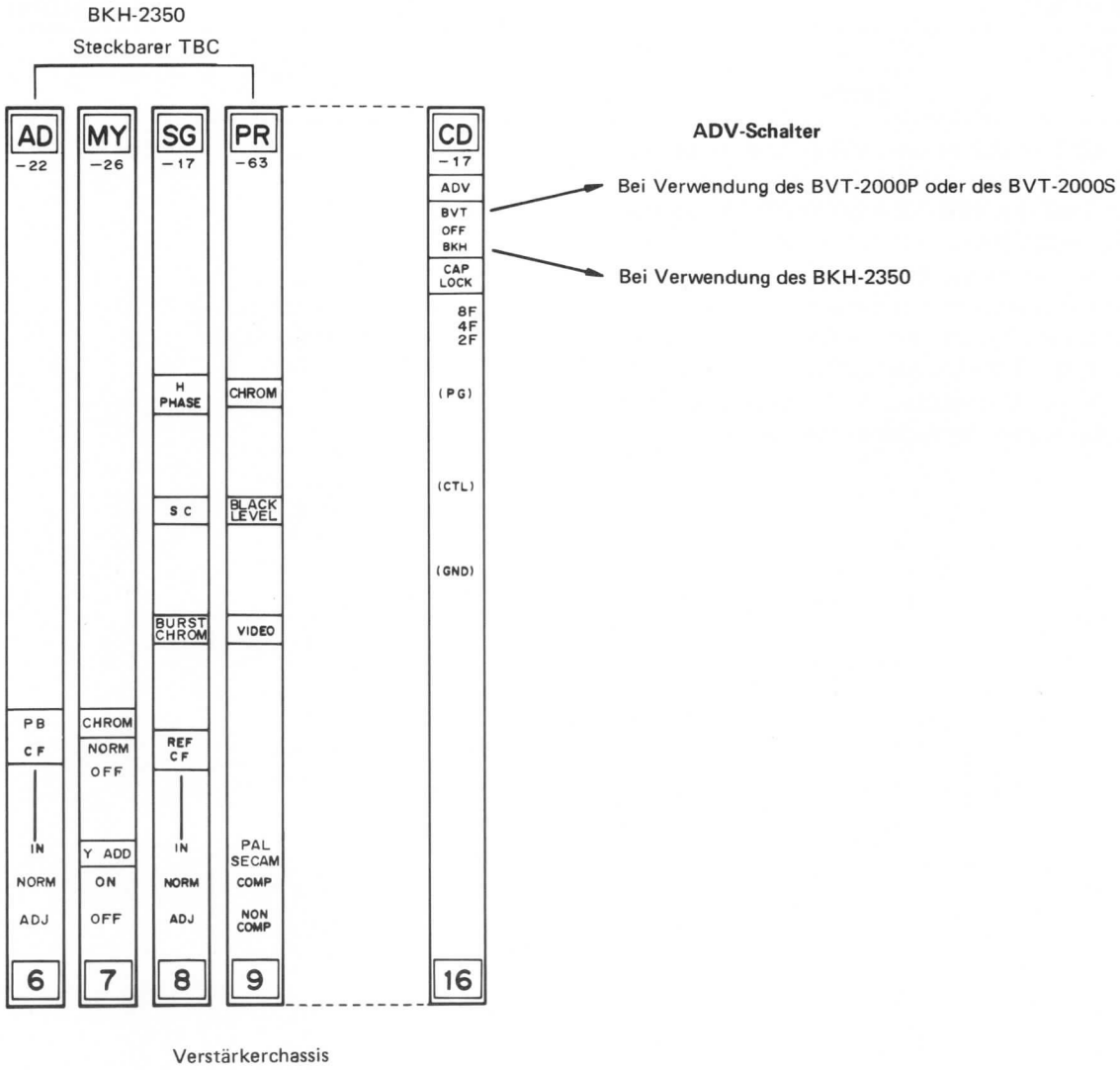
**Einstellung der halbbildrichtigen Farbträgerverkopplung (optimale Hilfsträger-H-Phase) des von Band wiedergegebenen Videosignals**

| Bedienung | Bemerkungen |
|---|---|
| Das Band mit Normalgeschwindigkeit in Vorwärtsrichtung wiedergeben. | |
| PB CF NORM/ADJ-Umschalter ⑳ auf ADJ stellen. | Der Einstellvorgang kann beginnen. Während des Einstellvorgangs leuchtet der rote PB CF ADJ-Indikator ㉑. |
| PB CF-Regler ⑱ so einstellen, daß der PB CF IN-Indikator ⑲ leuchtet. | Die Hilfsträger-H-Phase des von Band wiedergegebenen Videosignals wird auf diese Weise optimal eingestellt. |
| PB CF NORM/ADJ-Umschalter auf NORM zurückstellen. | Der Einstellvorgang ist beendet und der PB CF ADJ-Indikator erlischt. |

## 1-7. BETRIEB

**Wahl des Phasenvorlauf**

Stellen Sie den ADV-Schalter der CD-17-Leiterplatte des BVH-2000PS/2180PS auf BKH.



**Einstellung des REMOTE/LOCAL-Schalters**

Stellen Sie die REMOTE/LOCAL-Schalter der SG-17-, AD-22- und PR-63-Leiterplatten auf LOCAL.

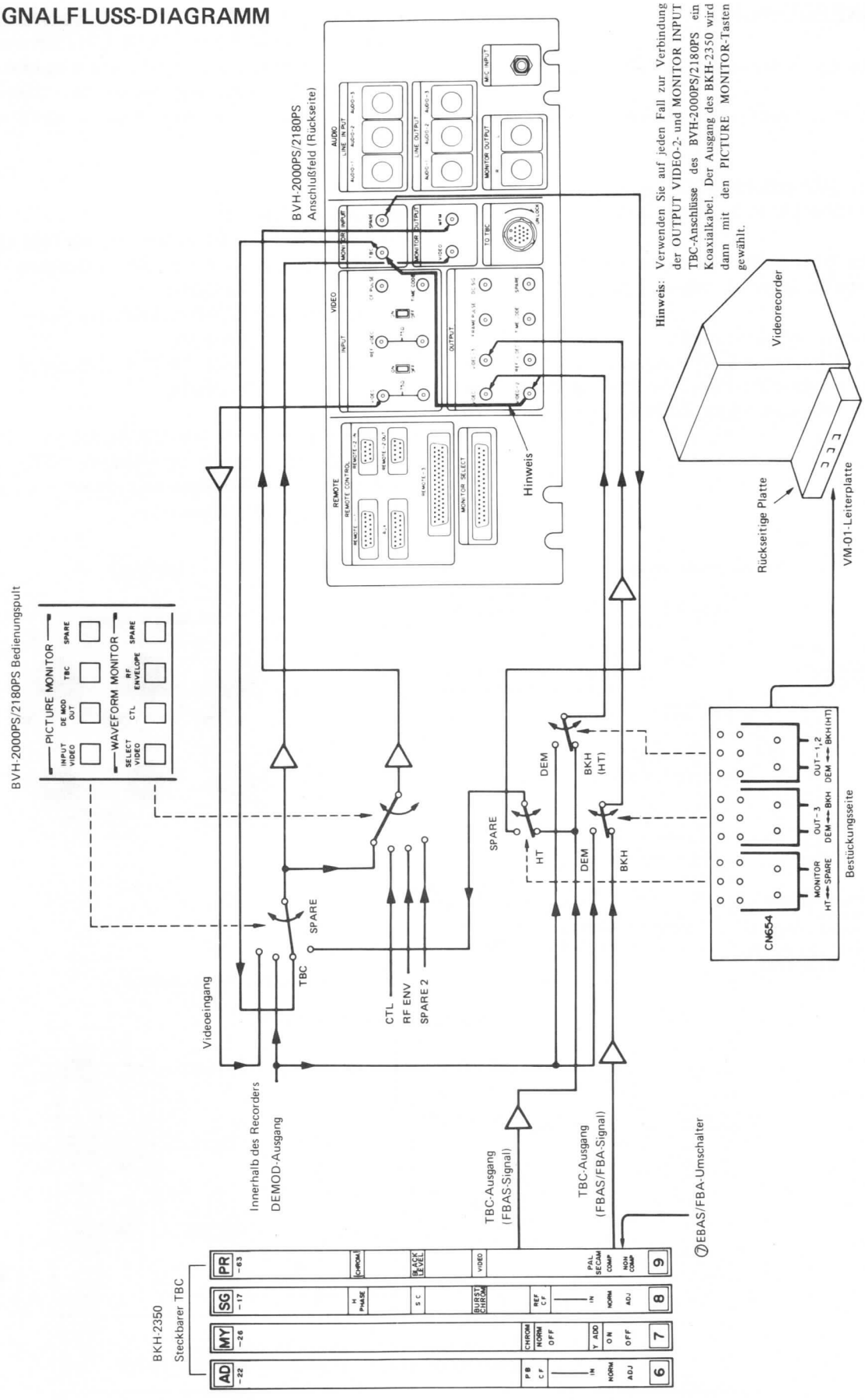
**Wahl der TBC-Ausgänge**

| AUSGÄNGE | OUT-3 DEM ↔ BKH Schalter der VM-01-Leiterplatte | OUT-1, 2 DEM ↔ BKH(HT) Schalter der VM-01-Leiterplatte | PICTURE MONITOR-Wahltaste des Videorecorders | WAVEFORM MONITOR-Wahltaste des Videorecorders |
|---|---|---|---|---|
| MONITOR VIDEO** | | BKH | TBC | |
| MONITOR WFM** | | BKH | TBC | SELECT VIDEO |
| VIDEO-1, VIDEO-2 | | BKH | | |
| VIDEO-3 | BKH* | | | |

* Ist der OUT-3-Schalter der VM-01-Leiterplatte des BVH-2000PS/2180PS auf BKH gestellt, so liegt das Ausgangssignal des BKH-2350 am VIDEO-3-Anschluß an. Am COMP/NON COMP-Schalter der PR-63-Leiterplatte kann das VIDEO-3-Ausgangssignal zwischen FBAS und FBA umgeschaltet werden.

** Zur Verbindung des OUTPUT VIDEO-2- und MONITOR INPUT TBC-Anschlusses des BVH-2000PS/2180PS ist ein Koaxialkabel zu verwenden, da sonst kein Ausgangssignal abgenommen werden kann.

## 1-8. SIGNALFLUSS-DIAGRAMM




**Hinweis**: Verwenden Sie auf jeden Fall zur Verbindung der OUTPUT VIDEO-2- und MONITOR INPUT TBC-Anschlüsse des BVH-2000PS/2180PS ein Koaxialkabel. Der Ausgang des BKH-2350 wird dann mit den PICTURE MONITOR-Tasten gewählt.

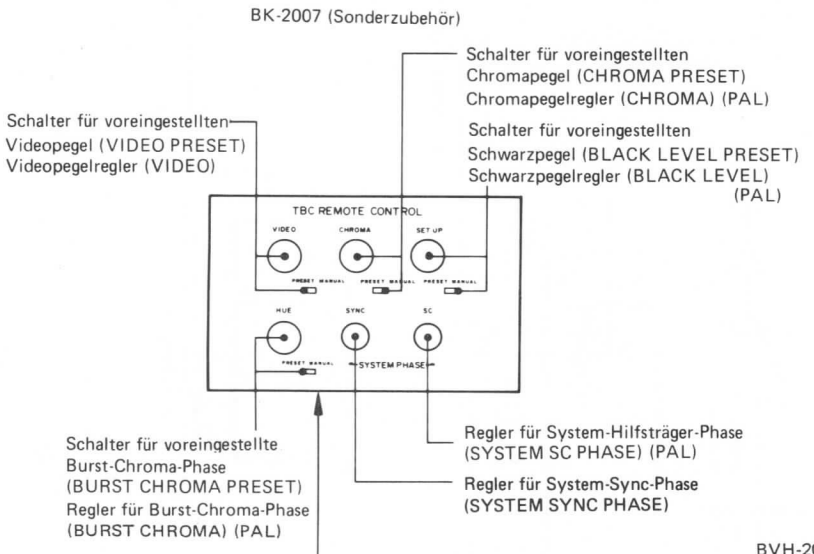
## 1-9. FERNBEDIENUNG

Fernbedienung ist in den folgenden Fällen möglich:

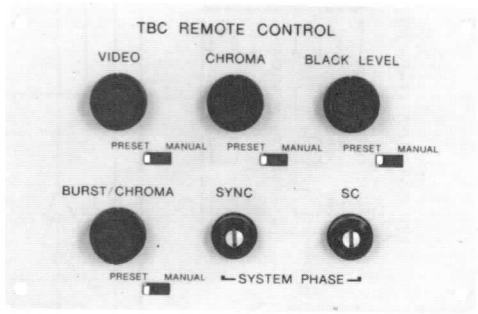
- Bei Verwendung des Fernbedienfeldes BK-2007 (Sonderzubehör).
- Wenn der BVH-2000PS in die Konsole SU-910 mit der SUA-911 (Monitorbrücke) eingebaut ist.
- Wenn der BVH-2180PS in die Konsole SU-950 oder SU-960 mit der SUA-951 eingebaut ist.

Folgendes kann fernbedient werden:
Videopegel, Schwarzpegel, Chromapegel, Burst-Chroma-Phase, System-Hilfsträger-Phase, System-Sync-Phase, Einstellung der halbbildrichtigen Farbträgerverkopplung von Band*.

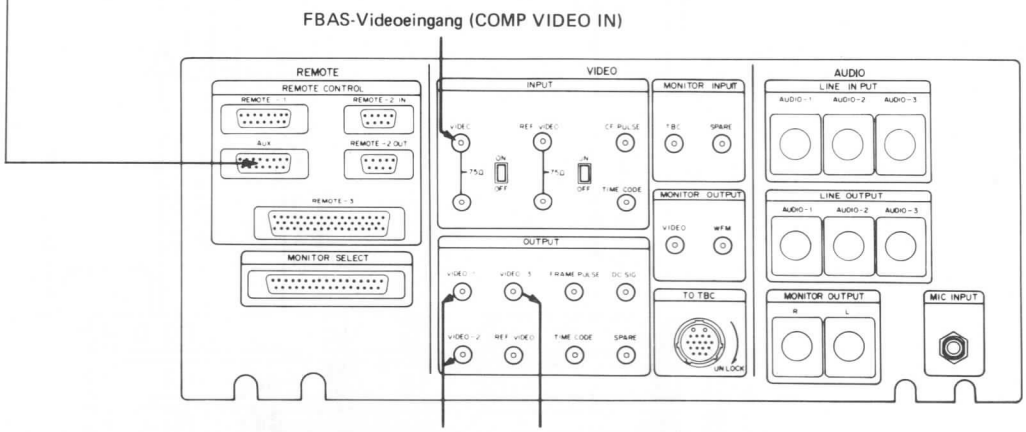
### Anschluß




BK-2007




BVH-2000PS/2180PS ANSCHLUSSFELD




* Die halbbildrichtige Farbträgerverkopplung von Band kann mit einer SUA-951 oder SUA-911 mit einer Serien-Nr. von 30000 und höher fernbedient eingestellt werden. Eine SUA-911 mit einer niedrigeren Steriennummer und das BK-2007 können dagegen nicht verwendet werden.

### Einstellung der Schalter

Stellen Sie die Schalter für Fernbetrieb wie folgt ein:

AD-22-Leiterplatte: REMOTE/LOCAL-Schalter ①* auf REMOTE.
SG-17-Leiterplatte: REMOTE/LOCAL-Schalter ② auf REMOTE.
PR-63-Leiterplatte: REMOTE/LOCAL-Schalter ⑧ auf REMOTE.

* Stellen Sie den REMOTE/LOCAL-Schalter ① auf der AD-22-Leiterplatte nur dann auf REMOTE, wenn die halbbildrichtige Farbträgerverkopplung von Band fernbedient eingestellt werden kann.

# SECTION 2
# INSTALLATION AND SERVICE INFORMATION



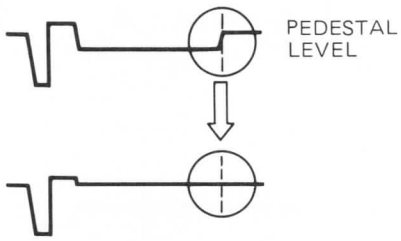
## 2-1. ADJUSTMENT

When the BKH-2350 is installed in VTR, perfrom the adjustments 2-1-1 to 2-1-4.
The adjustments 2-1-5 to 2-1-10 should be performed, if necessary.

### 2-1-1. Pedestal Level Offset Adjustment

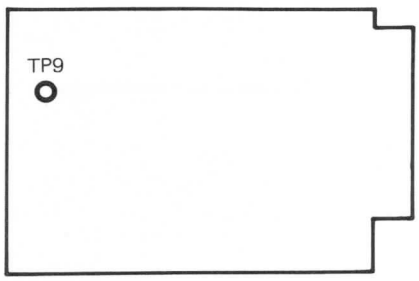
Equipment ; Oscilloscope
Mode of VTR ; EE
VTR input signal ; PAL or SECAM Video Signal

MY-26 Board
TP-9

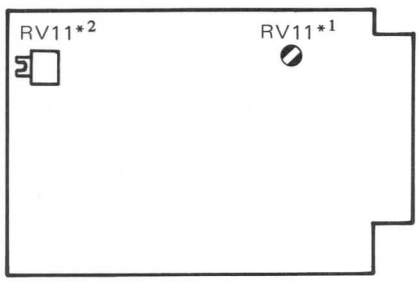



◐ RV11, AD-22 board

MY-26 Board




AD-22 Board



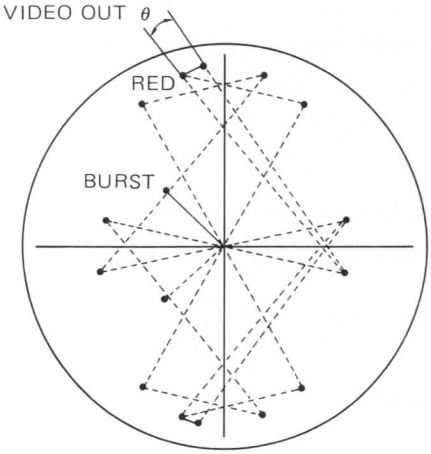

*1: For Board No. 1-615-705-11
*2: For Board No. 1-615-705-12 & up

### 2-1-2. PAL Velocity Error Offset Adjustment

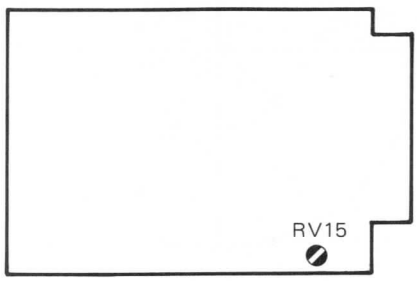
Equipment; Vectorscope
Mode of VTR; EE
Input Signal (VIDEO IN);
PAL Half-Red Color Bar Signal

**Adjustment**
Minimize the $\theta$.
◐RV15/SG-17

VTR VIDEO OUT $\theta$




SG-17 Board



## 2-1-3. PAL Burst-Chroma Phase Control Presetting

Equipment ; Vectorscope
Mode of VTR ; EE, Normal Play, DT STILL
VTR input signal ; PAL Color Bar Signal

**Step 1. Switch Setting**

BURST/CHROMA REMOTE/LOCAL sw (SG-17 board); LOCAL

**Step 2. LOCAL BURST/CHROMA Control Setting**

DC 0 V at the pin 3 of IC1L.

⊘ RV9/SG-17

**Step 3. Normal/DT Play Chroma Phase Adjustment**

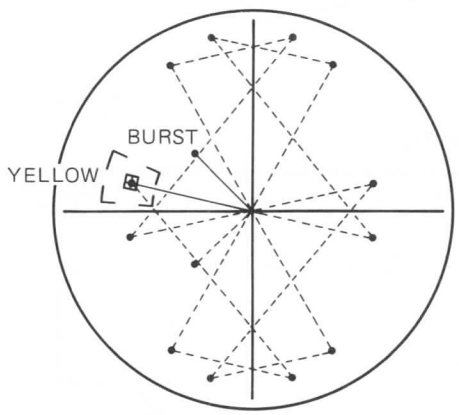
Coincide the yellow vector in the normal play mode with the yellow vector in the DT STILL mode by ⊘ RV3 on the SG-17 board.

**Step 4. Burst-Chroma Phase Presetting**

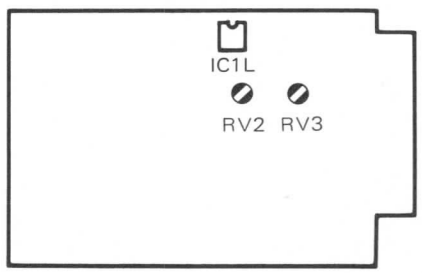
Set the BURST-YELLOW phase in the EE mode as below.

⊘ RV2, SG-17 board.

VTR VIDEO OUT




SG-17 Board

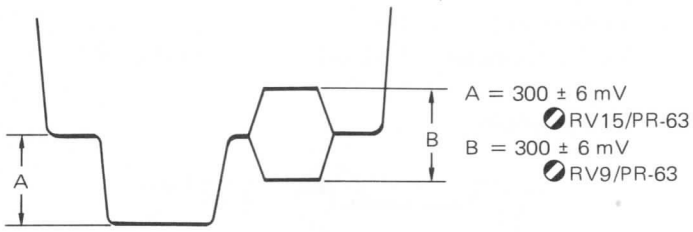



## 2-1-4. SYNC and Burst Level Adjustment

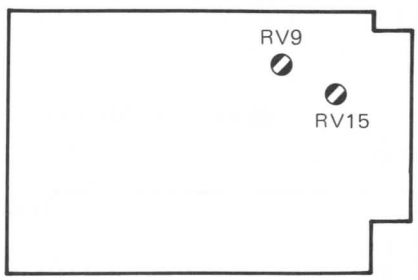
Equipment; Waveform Monitor
Mode of VTR; EE
Input Signal (VIDEO IN);
PAL Video Signal

**Adjustment**

VIDEO OUT-1/VTR

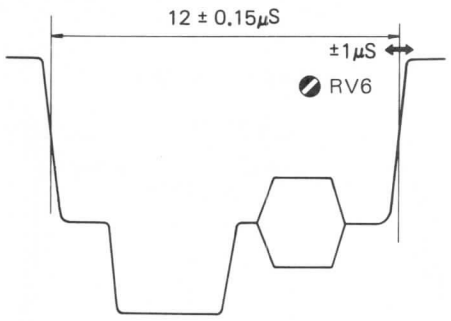



PR-63 Board

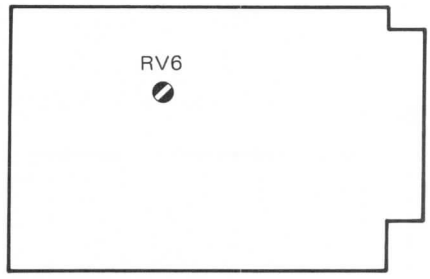


## 2-1-5. PAL H Blanking Width Adjustment

The H blanking width of the TBC output signal can be varied approximately +/–1 μs by RV6 on the SG-17 board.




SG-17 Board



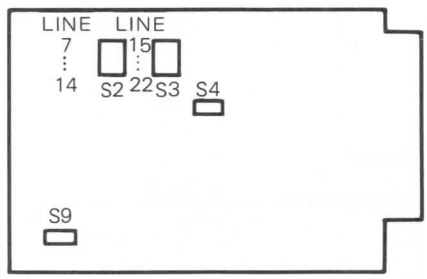

## 2-1-6. V Blanking Line Selection

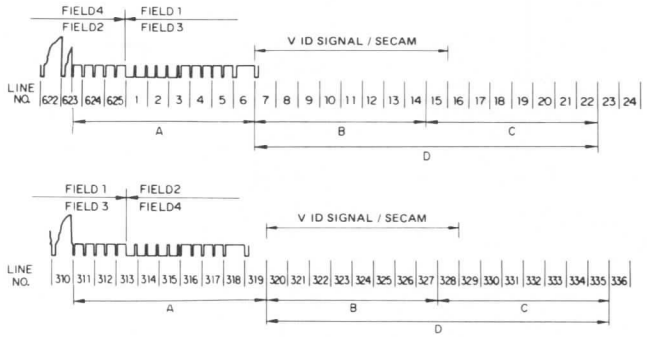
In the PAL mode, the V blanking of any line up to lines 7 (320) - 22 (335) of the TBC output can be turned ON/OFF by switches S2, S3 and S9 on the SG-17 board.
When the S9 is turned ON, the V blanking is always performed on the lines 7 (320) - 22 (335).
In the SECAM mode, when V ID ON/OFF switch (S4/SG-17 board) is turned ON, the V blanking ON/OFF works on the lines not having the V ID signal.

**S2, S3, S9 setting at the factory**

| | |
|---|---|
| S2; Lines 7 (320) to 14 (327) | ON |
| S3; Lines 15 (328) to 22 (335) | ON |
| S9; | OFF |
| S4; | ON |

SG-17 Board

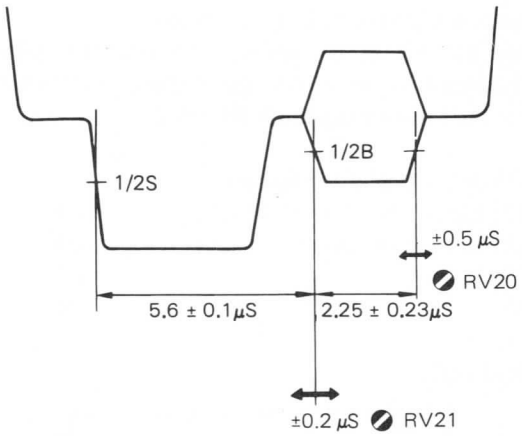


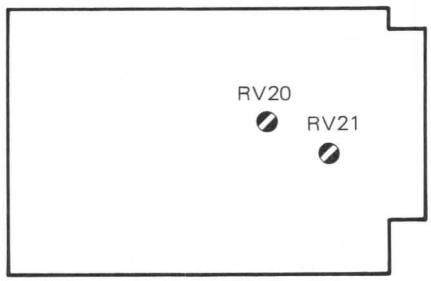

A; Not affected by S2, S3, S9. Blanking is always performed.
B; Affected by S2.
C; Affected by S3.
D; Affected by S9.

## 2-1-7. PAL Burst Position/Width Adjustment

The burst position and width of the TBC output can be varied by RV21 (position) and RV20 (width) on the PR-63 board.



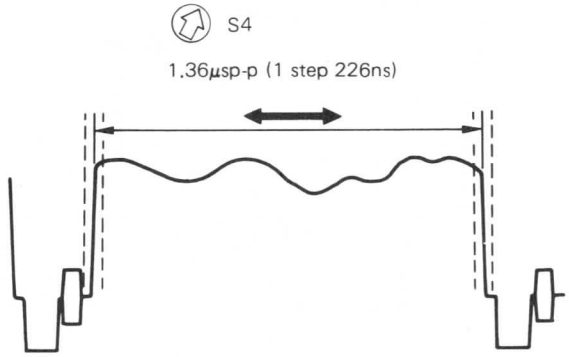

PR-63 Board



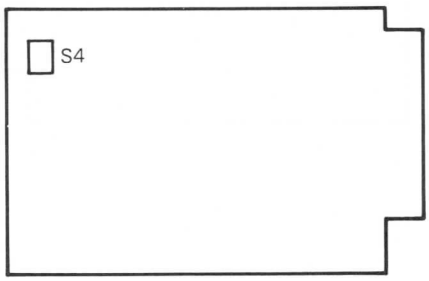

## 2-1-8. PAL Video Phase Adjustment

The video phase of the TBC output signal can be varied 1.36 µsp-p by rotary switch S4 on the AD-22 board.

S4; 1 step 226ns, x7 steps.



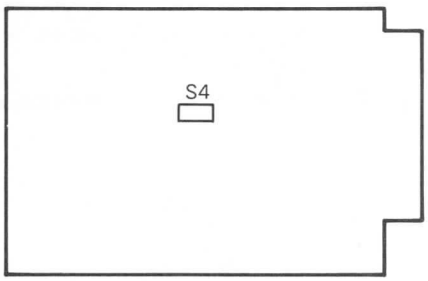

AD-22 Board



## 2-1-9. SECAM V ID Signal Setting

In the SECAM mode, the V ID signal can be turned ON/OFF by switch S4 on the SG-17 board.

SG-17 Board




V ID signal: Color-Identification signal in every field-blanking interval.

## 2-1-10. Adjustment after Board Replaced (PAL)

When the AD-22 board is replaced, the adjustments, step 1, 2, 3 and 4 should be performed.
When the SG-17 board is replaced, step 1, 2 and 3 should be performed.
When the PR-63 board is replaced, step 3 should be performed.

**Step 1. Velocity Error Offset Adjustment**

| | | |
|---|---|---|
| Equipment | ; | Vectorscope<br>PAL Test Signal Generator |
| Mode of VTR | ; | EE |
| VTR input signal | ; | PAL Split-Field Red Signal |

Minimize the red spot size by RV15 on the SG-17 board.

**Step 2. Velocity Error Gain Adjustment**

| | | |
|---|---|---|
| Equipment | ; | Vectorscope |
| Mode of VTR | ; | Normal Playback |
| VTR playback signal | ; | Color Bar |

Minimize the BLUE spot size by RV14 on the SG-17 board.

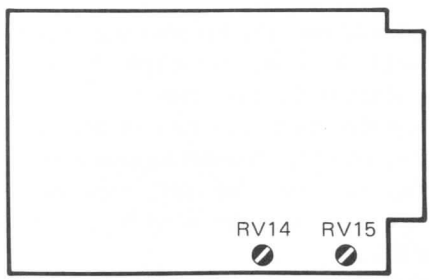
**Step 3. Burst-Chroma Phase Adjustment**

Perform the Sec. 2-1-3 "PAL Burst-Chroma Phase Control Presetting".

**Step 4. Pedestal Level Offset Adjustment**

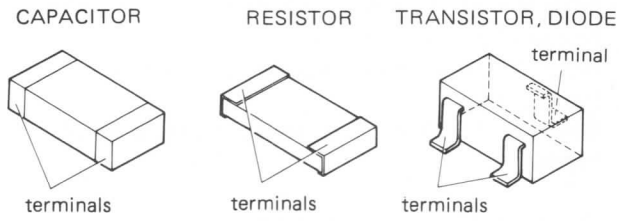
Perform the Sec. 2-1-1 "Pedestal Level Offset Adjustment".

SG-17 Board




* Step 1, 2 observation point; VTR, VIDEO OUT.

## 2-2. REPLACEMENT PROCEDURE OF CHIP PART




### 2-2-1. Required Tools

Soldering iron 20W:
If possible, use the soldering-iron tip heat-controller at 270 ± 10°C.
Braided wire:
SOLDER TAUL or equivalent
Sony Part No. 7-641-300-81
Solder: 0.6 mm dia. is recommended.
Tweezers

### 2-2-2. Soldering Conditions

Soldering iron temperature:
270 ± 10°C
Soldering time:
2 seconds per a pin

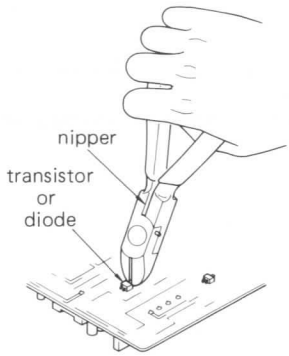
### 2-2-3. Replacement of Resistor and Capacitor

1. Place the soldering-iron tip onto the chip part and heat it up until the solder is melted. When the solder is melted, slide the chip part aside.
2. Make sure that there is no pattern peeling, damage and/or bridge around the desoldering positions.
3. After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
4. Place new chip part in the desired position and solder both ends.

**CAUTION**
Do not use the chip part again once it has been removed.

### 2-2-4. Replacement of Transistor and Diode

1. Cut the terminals of the chip part with nippers.
2. Remove the leads cut as above.
3. Make sure that there is no pattern peeling, damage and/or bridge around the desoldering positions.
4. After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
5. Place new chip part in the desired position and solder the terminals.




### 2-2-5. Replacement of IC

1. Using the braided wire, "SOLDER TAUL" Sony Part No. 7-641-300-81, remove the solder around the pins of the IC-chip to be removed.
2. While heating up the pins, remove the pins one by one using sharp-pointed tweezers.
3. Make sure that there is no pattern peeling, damage and/or bridge around the desoldering positions.
4. After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
5. Place new chip part in the desired position and solder the pins.

# SECTION 4
# GENERAL INFORMATION FOR ALIGNMENT

## 4-1. INDEX OF ALIGNMENT COMPONENTS


**AD-22 Board**

| | Section | | Section |
|---|---|---|---|
| LV1 | 6-2-3 | RV1 | 6-2-1 |
| RV2 PB CF | | | 6-2-9 |
| RV3 | 6-2-2 | RV11 | 7-1-3 |
| RV4 | 6-2-6 | RV12 | 7-1-2 |
| RV6 | 6-2-4 | RV14 | 7-1-1 |
| RV8 | 6-2-5 | RV15 | 6-2-7 |
| RV9 | 6-2-9 | RV16 | 6-2-8 |
| RV10 | 6-2-10 | S1 | 5-5 |
| S2 PB CF | | | 5-5 |
| S3 | 5-5 | S4 | 5-5 |

**MY-26 Board**

| | |
|---|---|
| S1 CHROMA | 5-5 |
| S2 Y ADD | 5-5 |
| S4 | 5-5 |

**SG-17 Board**

| | | | |
|---|---|---|---|
| LV1 | 6-1-1, 8-1-3 | RV3 | 8-1-2 |
| | | RV4 | 6-1-6 |
| RV1 | 6-1-2 | RV5 | 6-3-2 |
| RV2 | 8-1-2 | RV6 | 6-1-5 |
| RV7 H PHASE | | | 5-5 |
| RV8 SC PHASE | | | 5-5 |
| RV9 BURST PHASE | | | 5-5 |
| RV10 REF CF | | | 5-5 |
| RV11*1 | 6-1-3 | RV16 | 6-1-7 |
| RV12 | 6-1-4 | S1 | 5-5 |
| RV13 | 6-3-1 | S2 | 5-5 |
| RV14 | 8-1-1 | S3 | 5-5 |
| RV15 | 6-3-1, 8-1-1 | S4 | 5-5 |
| S6 RF CF | | | 5-5 |
| S7 | 5-5 | S9 | 5-5 |
| S8 | 5-5 | | |

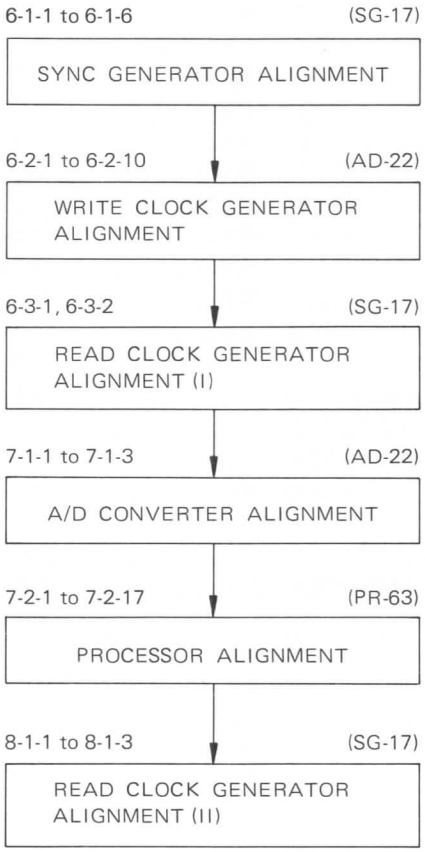
**PR-63 Board**

| | | | |
|---|---|---|---|
| CV1 | 7-2-7 | RV13 | 7-2-14 |
| LV1 | 7-2-9 | RV14 | 7-2-5 |
| LV2 | 7-2-9 | RV15 | 7-2-2 |
| LV4 | 7-2-16 | RV16 | 7-2-9 |
| RV3 | 7-2-6 | RV17 | 7-2-13 |
| RV4 | 7-2-7 | RV18 | 7-2-12 |
| RV5 | 7-2-8 | RV19 | 7-2-12 |
| RV6 | 7-2-7 | RV20 | 7-2-4 |
| RV8 | 7-2-1 | RV21 | 7-2-4 |
| RV9 | 7-2-3 | RV22 | 7-2-15 |
| RV10 | 7-2-11 | RV23 | 7-2-17 |
| RV12 | 7-2-14 | RV24*2 | 7-2-18 |
| RV26 CHROMA LEVEL | | | 5-5 |
| RV27 BLACK LEVEL | | | 5-5 |
| RV28 VIDEO LEVEL | | | 5-5 |
| RV30 | 7-2-10 | S1 | 5-5 |
| S2 PAL/SECAM | | | 5-5 |
| S3 COMP/NON-COMP | | | 5-5 |

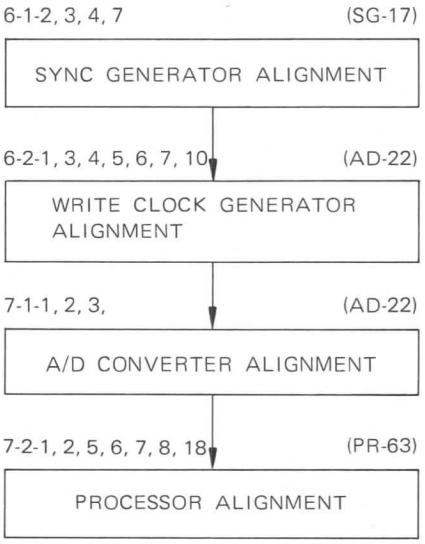

*1. For SG-17 Board No. 1-615-707-11 and 12
*2. For PR-63 Board No. 1-615-708-13 and up

## 4-2. ALIGNMENT SEQUENCE

**For PAL**




**For SECAM**


6-1-2, 3, 4, 7 (SG-17)
SYNC GENERATOR ALIGNMENT
6-2-1, 3, 4, 5, 6, 7, 10 (AD-22)
WRITE CLOCK GENERATOR ALIGNMENT
7-1-1, 2, 3, (AD-22)
A/D CONVERTER ALIGNMENT
7-2-1, 2, 5, 6, 7, 8, 18 (PR-63)
PROCESSOR ALIGNMENT

# SECTION 5
# PREPARATION FOR ALIGNMENT

## 5-1. EQUIPMENT REQUIRED

**1. PAL Test Signal Generator**
TEKTRONIX Type 1411 or Equivalent

| | | |
|---|---|---|
| Test Signal Module | SYNC GENERATOR | SPG12 |
| | COLOR BAR GEN. | TSG11 |
| | PULSE & BAR GEN. | TSG15 |
| | MULTI BURST GEN. | TSG16 |

Refer to section 5-2 for signal details.

**2. SECAM Test Signal Generator**
TEKTRONIX Type 143 or Equivalent
Refer to section 5-2 for signal details.

**3. PAL Vectorscope**
TEKTRONIX Type 521A or Equivalent

**4. Oscilloscope**
TEKTRONIX Type 465B or Equivalent

**5. Digital Voltmeter**
Effective digits; more than 4½ digits
Accuracy; less than 0.02% ± 1 count

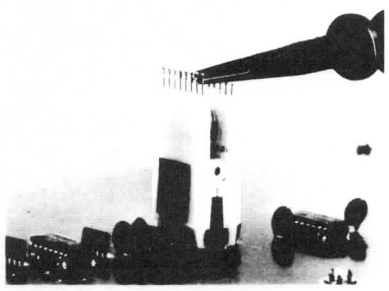
**6. Video Tape Recorder**
SONY BVH-2000PS

**7. Extender; EB-10 (Supplied with BVH-2000PS)**
SONY Part No. A-6001-005-A

**8. Alignment Tape; BR5-2PS-A4**
SONY Part No. 8-944-005-62

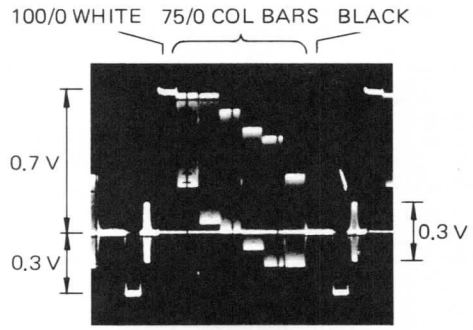
**9. Empty Reel**

**10. IC Test Clip**
Type TC-16: SONY Part No. J-6041-770-A
Type TC-20: SONY Part No. J-6041-780-A
Manufacturer;
AP PRODUCTS INCORPORATED
P.O.Box 697, 72 Corwin Drive
Peinesville, Ohio 44077, U.S.A.
Tel: (216) 354-2101
When connecting the test probe to the terminal of DIP integrated circuit, these clips are convenient. Type TC-16 is for DIP 14-pin or 16-pin IC and Type TC-20 is for 18-pin or 20-pin IC.

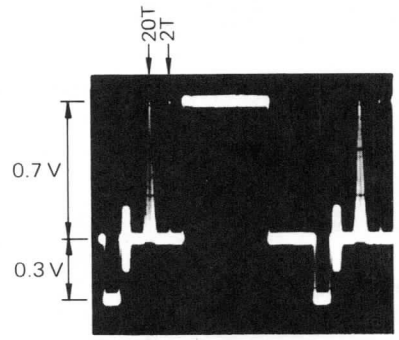


## 5-2. TEST SIGNALS

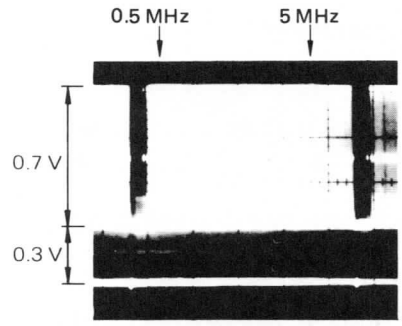
**PAL COLOR BARS**



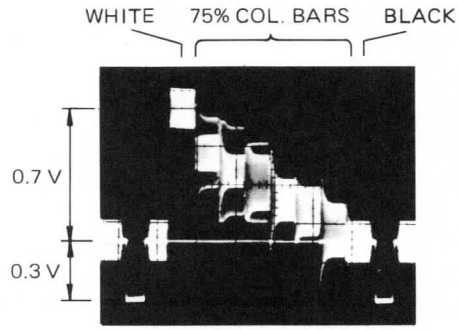

**PAL PULSE & BAR**




**PAL FIELD RATE SWEEP**

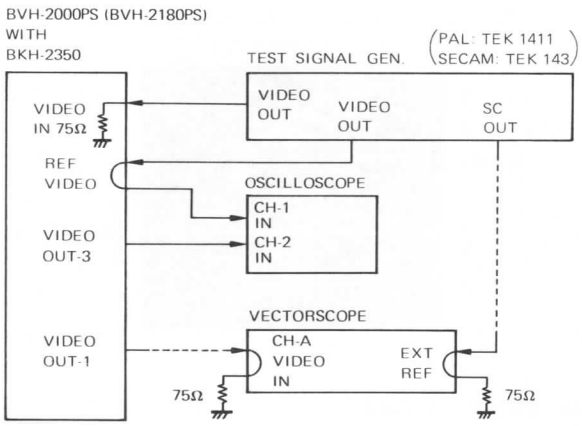



**SECAM COLOR BARS**



## 5-3. CONNECTIONS

**CONNECTION 1.**




## 5-4. INITIAL SETTING OF THE BVH-2000PS

### 5-4-1. Level Control Panel

REMOTE/LOCAL Sw . . . . . LOCAL

### 5-4-2. Function Control Panel

TAPE/EE Sel . . . . . TAPE/EE
SERVO REF Sel . . . . . INPUT
HEAD Selector . . . . . R/P

### 5-4-3. Connector Panel

**VM-01 Board**
V-OUT1, 2 DEM/BKH (HT) Sw . . . . . BKH
V-OUT3 DEM/BKH Sw . . . . . BKH

### 5-4-4. Other Switch and Control Setting

**CD-17 Board**
ADV BVT/OFF/BKH . . . . . BKH

As for the switch and control setting not designated in section 5-4-1 to 5-4-3 and CD-17 Board set them to the suitable position for NORMAL-PLAY or AUTO E-E mode.

## 5-5. INITIAL SETTING OF THE BKH-2350

**AD-22 Board**
REMOTE/LOCAL Sw (S1) . . . . . ALL REMOTE
PB CF NORM/ADJ (S2) . . . . . NORM
STAND BY Sw (S3) . . . . . ON
VIDEO PHASE Sw (S4) . . . . . "2"

**SG-17 Board**
REMOTE/LOCAL Sw (S1) . . . . . ALL REMOTE
V BLK Sw (S2) . . . . . ALL ON
V BLK Sw (S3) . . . . . ALL ON
VID ON/OFF (S4) . . . . . ON
REF CF NORM/ADJ (S6) . . . . . NORM
EDIT ENABLE Sw (S7) . . . . . ON
EE SHIFT Sw (S8) . . . . . OFF
BLK Sw (S9) . . . . . OFF
H PHASE Cont (RV7) . . . . . *Mid-rotation
SC PHASE Cont (RV8) . . . . . *Mid-rotation
B-C PHASE Cont (RV9) . . . . . *Mid-rotation
REF CF Cont (RV10) . . . . . *Mid-rotation

**PR-63 Board**
REMOTE/LOCAL Sw (S1) . . . . . ALL REMOTE
PAL/SECAM Sel (S2) . . . . . PAL
COMP/NON-COMP Sw (S3) . . . . . COMP
BURST ON/OFF Sw (S4) . . . . . ON
CHROMA LEVEL Cont (RV26) . . . . . *Mid-rotation
BLACK LEVEL Cont (RV27) . . . . . *Mid-rotation
VIDEO LEVEL Cont (RV28) . . . . . *Mid-rotation

**MY-26 Board**
CHROM Sw (S1) . . . . . NORM
Y ADD Sw (S2) . . . . . ON
DO Sw (S4) . . . . . EN

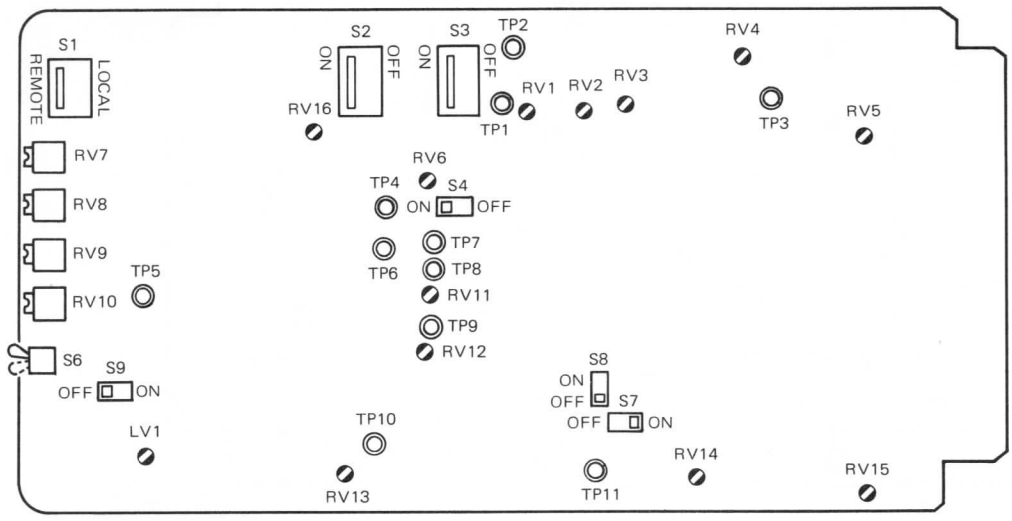
## 5-6. INITIAL SETTING OF THE BK-2007

If the BK-2007 or other remote control unit (optional) is used, set the all of PRESET/MANUAL switches to PRESET.

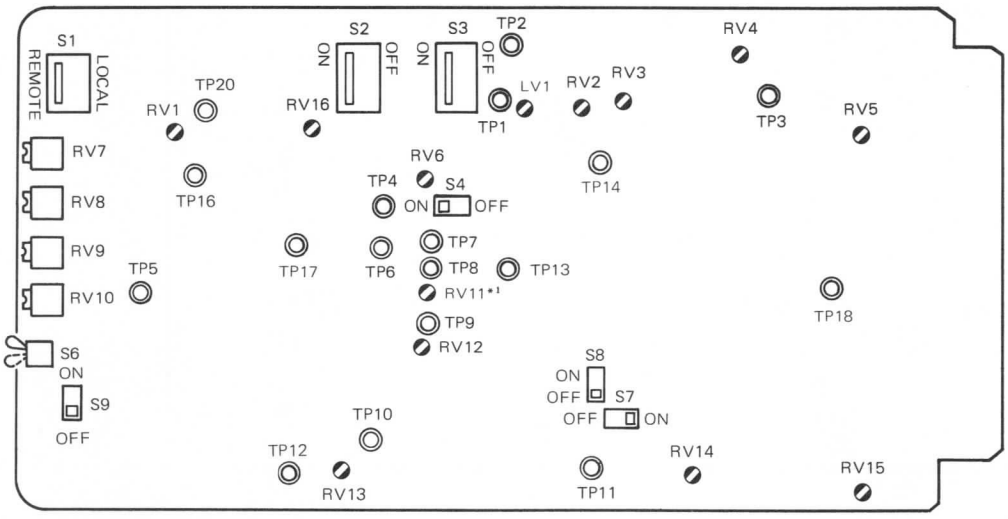
# SECTION 6
# CLOCK AND CONTROL SIGNAL SYSTEM ALIGNMENT

## SG-17 Board

**1-615-707-11**



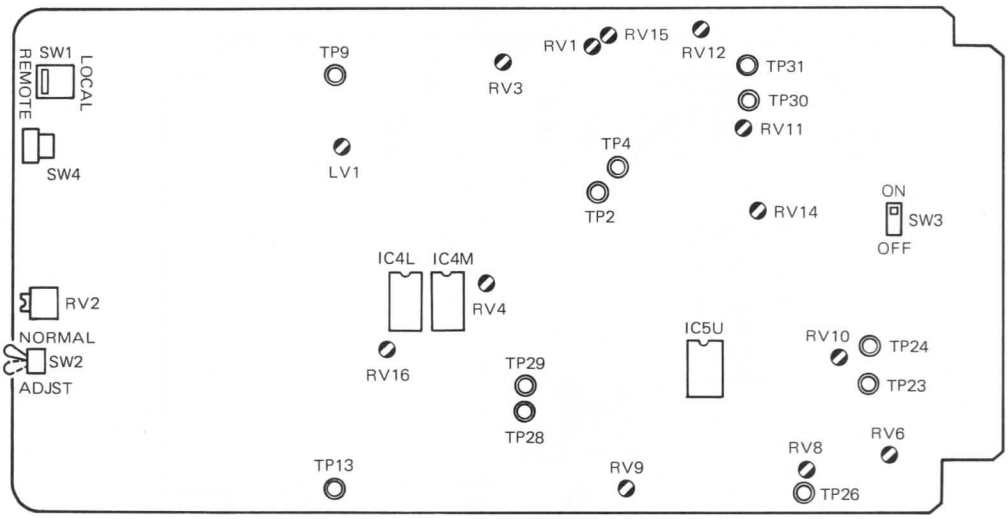

**1-615-707-12 & UP**



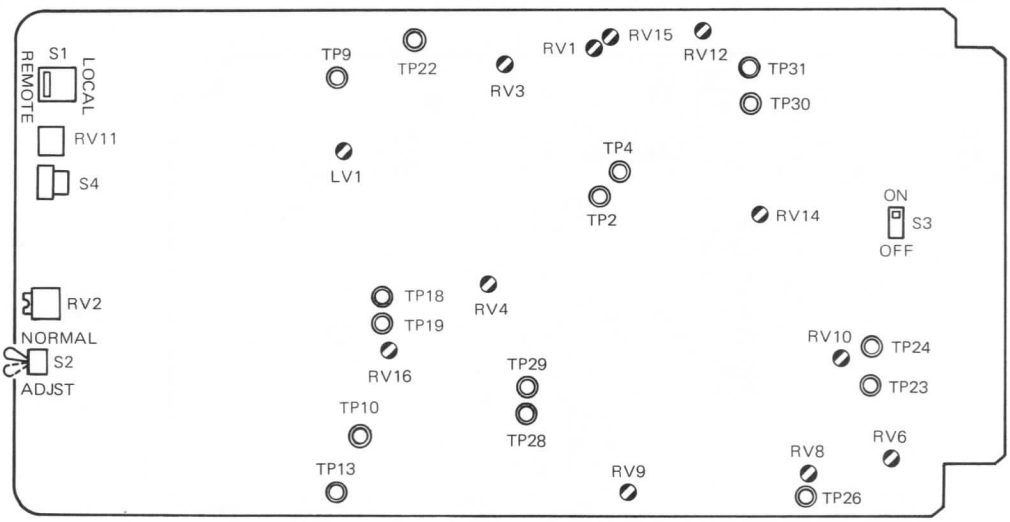

*1. For board No. 1-615-707-12

## AD-22 Board

### 1-615-705-11




### 1-615-705-12 & UP

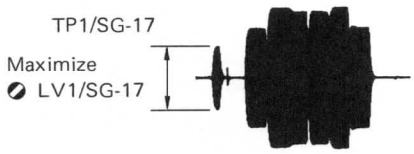


## 6-1. SYNC GENERATOR ALIGNMENT

### 6-1-1. PAL Burst Tuning Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL Video Signal

**Adjustment**

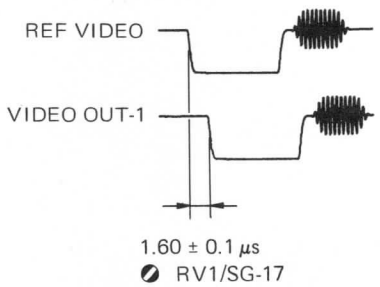



### 6-1-2. Sync Phase Preset Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63; Depends on the input video signal.
Input Signal (VIDEO IN);
PAL or SECAM Video Signal

**Step 1.**
REMOTE/LOCAL Sw (S1)/SG-17: LOCAL
H Phase Control ( ⊘ RV7)/SG-17: Fully clockwise

**Step 2.**



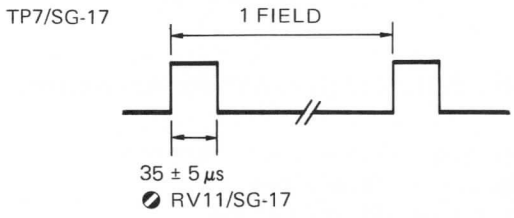

**Step 3.**
REMOTE/LOCAL Sw (S1)/SG-17: REMOTE

### 6-1-3. Frame Reset Pulse Width Adjustment

**For SG-17 Board No. 1-615-707-11 and 12**

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: Depends on the input video signal.
Input Signal (VIDEO IN);
PAL or SECAM Video Signal

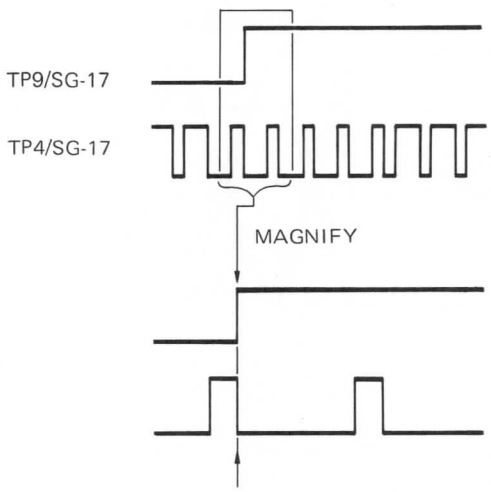
**Adjustment**




### 6-1-4. TBC Frame Signal Phase Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: Depends on the input video signal.
Input Signal (VIDEO IN);
PAL or SECAM Video Signal

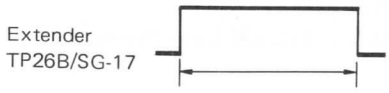
**Adjustment**



## 6-1-5. PAL H Blanking Pulse Width Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL Video Signal

**Adjustment**

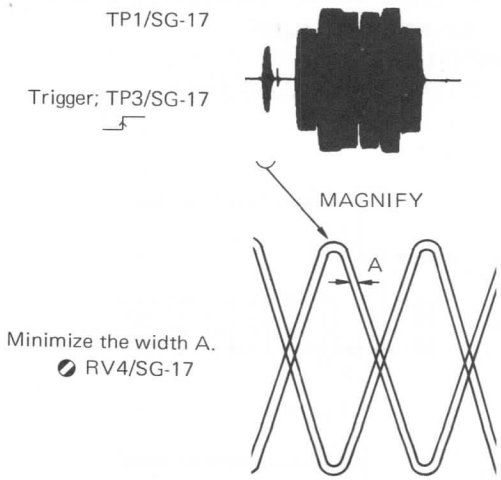



12.00 ± 0.15 μs
RV6/SG-17

## 6-1-6. PAL Modulation Width Adjustment

Connection; See section 5-3 connection1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL Video Signal

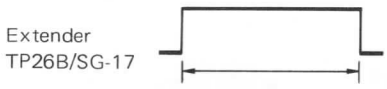
**Step 1. Read Modulation Width Adjustment**




## 6-1-7. SECAM H Blanking Pulse Width Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63; SECAM
Input Signal (VIDEO IN);
SECAM Video Signal

**Adjustment**



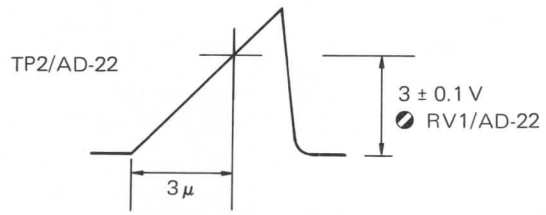

5.6 ± 0.1 μs
RV16/SG-17

## 6-2. WRITE CLOCK GENERATOR ALIGNMENT

### 6-2-1. Sawtooth Level Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: Depends on the input video signal.
Input Signal (VIDEO IN);
PAL or SECAM Video Signal

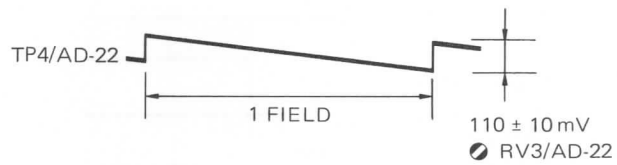
**Adjustment**




### 6-2-2. PAL H Modulator Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL Video Signal

**Adjustment**




### 6-2-3. H AFC Bias Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: Depends on the input video signal.
Input Signal (VIDEO IN);
PAL or SECAM Video Signal

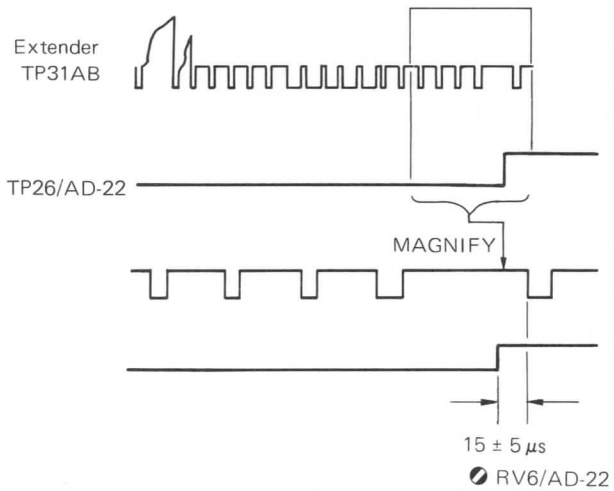
**Adjustment**

TP9/AD-22 = 0 ± 0.1 V
RV1/AD-22

### 6-2-4. Write V Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: Depends on the input video signal.
Input Signal (VIDEO IN);
PAL or SECAM Video Signal

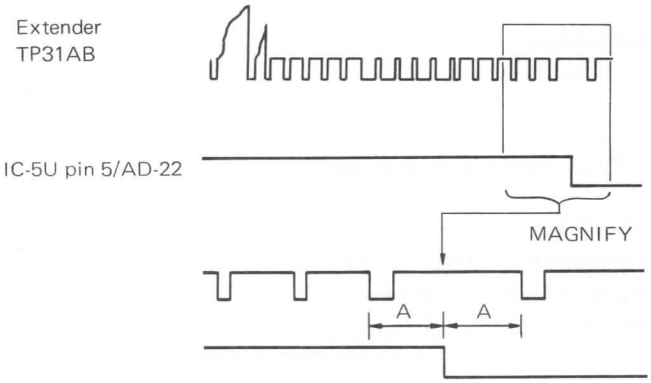
**Adjustment**



## 6-2-5. V Inhibit Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: Depends on the input video signal.
Input Signal (VIDEO IN);
PAL or SECAM Video Signal

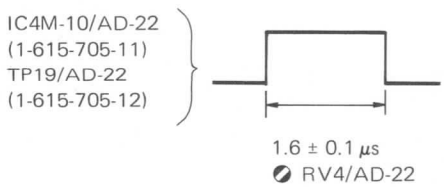
**Adjustment**




## 6-2-6. SECAM Write Zero Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: Depends on the input video signal.
Input Signal (VIDEO IN);
PAL or SECAM Video Signal

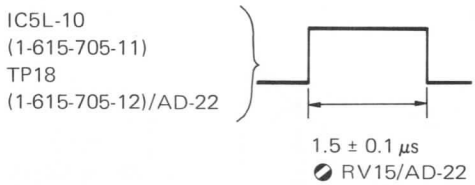
**Adjustment**




## 6-2-7. Fast Bidirex Write Zero Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: Depends on the input video signal.
Input Signal (VIDEO IN);
PAL or SECAM Video Signal

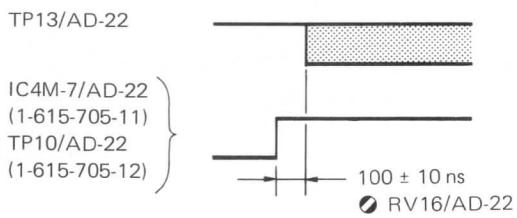
**Adjustment**




## 6-2-8. PAL Start Pulse Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL Video Signal

**Adjustment**

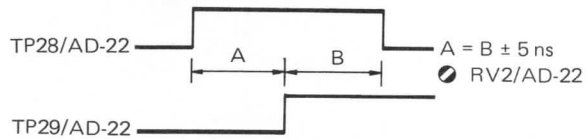


## 6-2-9. PAL PB CF Window Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL Video Signal

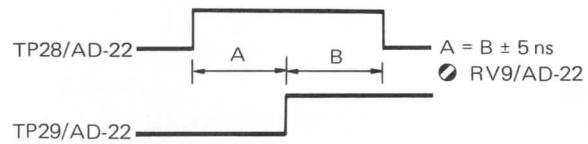
**Step 1.**
Set the REMOTE/LOCAL Sw (S1/AD-22) to LOCAL and set the PB CF NOR/ADJ Sw (S2/AD-22) to ADJ.

**Adjustment**




**Step 2.**
Set the PB CF NOR/ADJ Sw (S1/AD-22) to NORMAL.

**Adjustment**



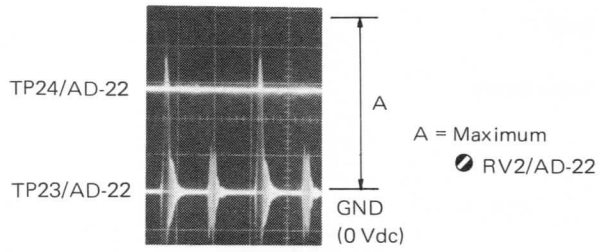

**Step 3.**
Set the REMOTE/LOCAL Sw (S1/AD-22) to REMOTE.

## 6-2-10. SECAM ID Detector Adjustment

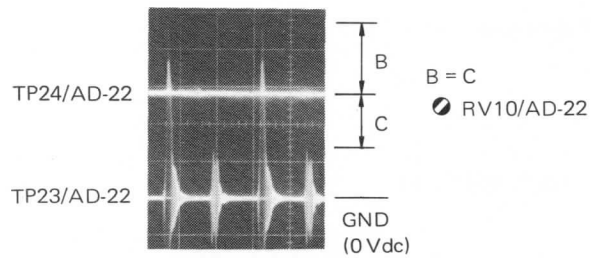
Connection; See section 5-3 connection 1.
Equipment; Oscilloscope (DC mode, 0.2 V/DIV)
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: SECAM
Input Signal (VIDEO IN);
SECAM Video Signal

**Step 1.**
Set the REMOTE/LOCAL Sw (S1/AD-22) to LOCAL.

**Step 2.**
Maximize the level A.




**Step 3. Adjustment**




**Step 4.**
Set the REMOTE/LOCAL Sw (S1/AD-22) to REMOTE.

## 6-3. READ CLOCK GENERATOR ALIGNMENT

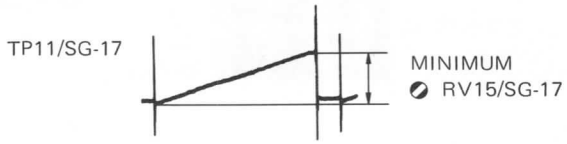
### 6-3-1. PAL SC Phase Shifter Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL Video Signal

**Step 1.**
Insert the SG-17 board through the Extender and connect a jumper between TP15A and TPG on the Extender.

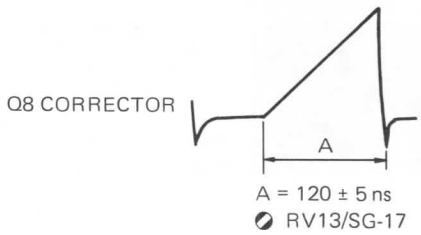
**Step 2.**

**Adjustment**




**Step 3.**

**Adjustment**

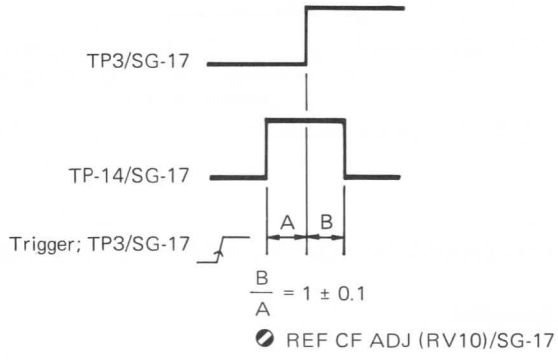



**Step 4. Disconnect a jumper between TP15A and TPG on the Extender.**

### 6-3-2. PAL Ref. Color Framing Window Phase Adjustment

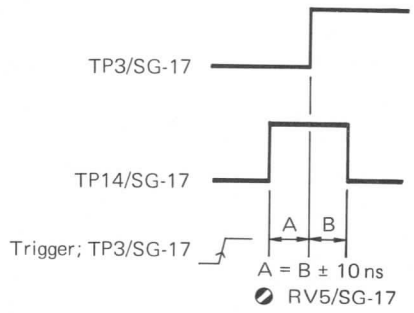
Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2) PR-63: PAL
REF CF NORM/ADJ Sw (S6)/SG-17: ADJ
Input Signal (VIDEO IN);
PAL Video Signal

**Step 1. Window Phase Adjustment 1**




**Step 2.**
Set the REF CF NORM/ADJ Sw to NORM.

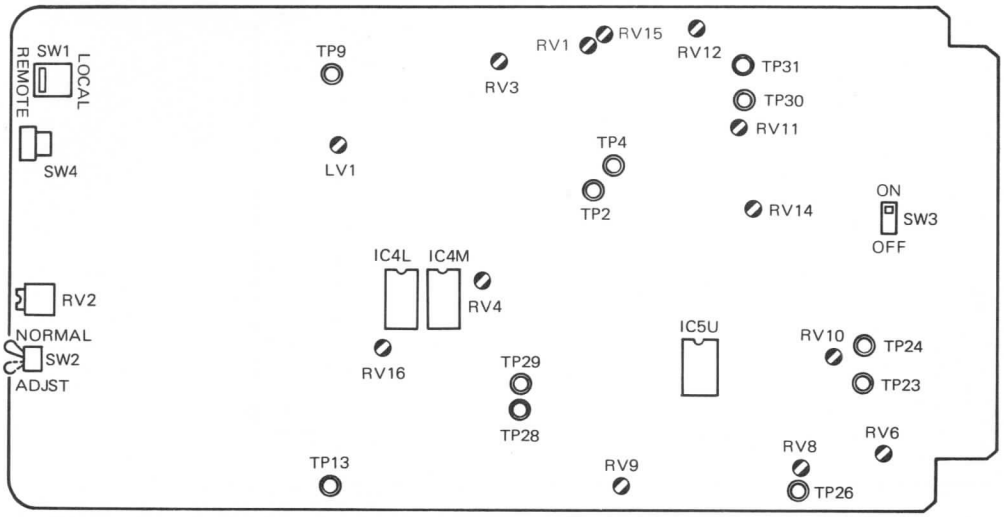
**Step 3. Window Phase Adjustment 2**



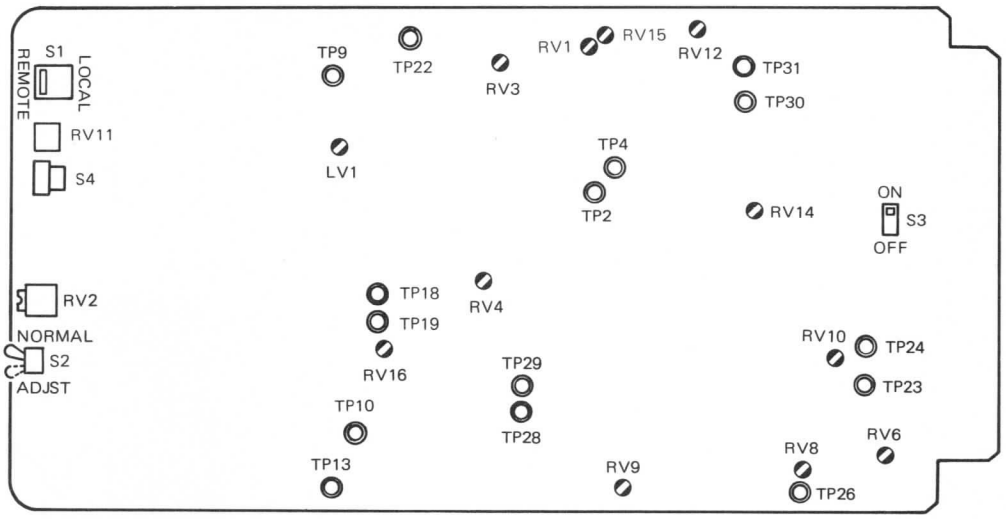
# SECTION 7
# VIDEO SIGNAL SYSTEM ALIGNMENT

## AD-22 Board

**1-615-705-11**

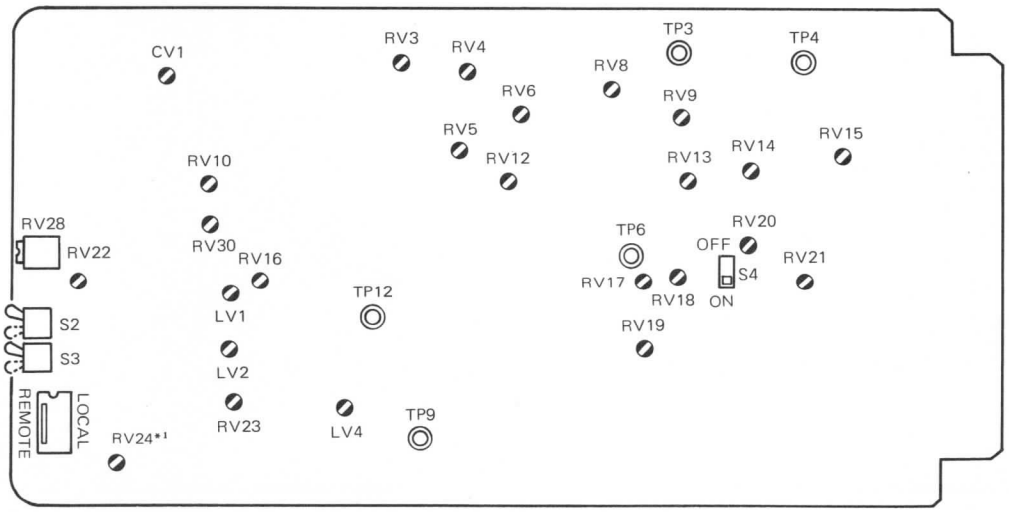



**1-615-705-12 & UP**




## PR-63 Board

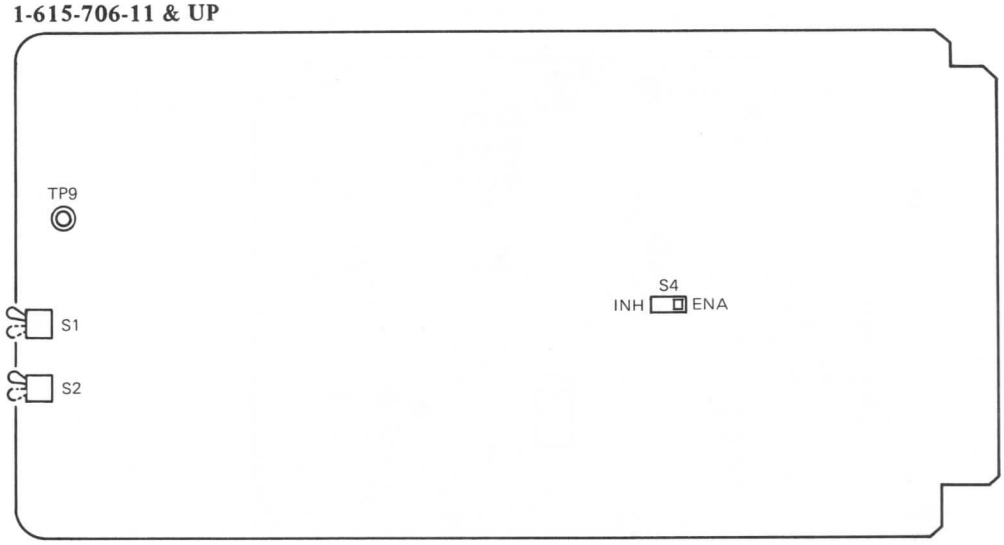
**1-615-708-11 & UP**




*1. For PR-63 Board
No. 1-615-708-13 and up

## MY-26 Board

**1-615-706-11 & UP**



## 7-1. A/D CONVERTER ALIGNMENT

### 7-1-1. A/D Converter Reference Voltage Adjustment

Connection; See section 5-3 connection 1.
Equipment; Digital Voltmeter
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
Irrelevant
Input Signal (VIDEO IN);
Irrelevant

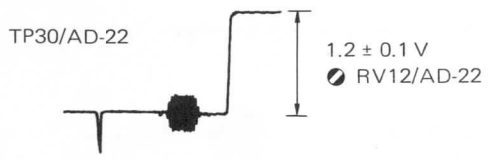
**Adjustment**

TP31/AD-22 = −2 ± 0.002 Vdc
⊘ RV14/AD-22

### 7-1-2. A/D Converter Video Level Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: Depends on the input video signal.
Input Signal (VIDEO IN);
PAL COLOR BARS or SECAM COLOR BARS

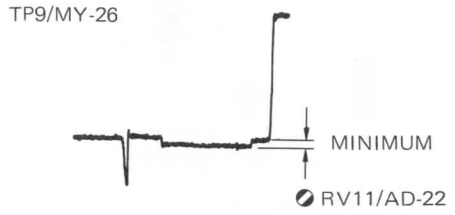
**Adjustment**




### 7-1-3. A/D Converter Video Offset Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: Depends on the input video signal.
Input Signal (VIDEO IN);
PAL COLOR BARS or SECAM COLOR BARS

**Adjustment**

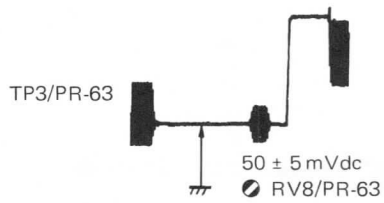


## 7-2. PROCESSOR ALIGNMENT

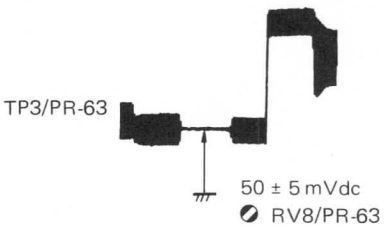
### 7-2-1. Dark Clip Level Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: Depends on the input video signal.
Input Signal (VIDEO IN);
PAL COLOR BARS or SECAM COLOR BARS

**Adjustment for PAL**



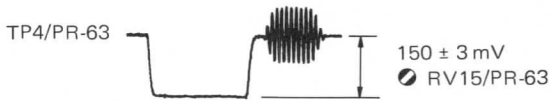

**Adjustment for SECAM**




### 7-2-2. Sync Level Adjustment

Conneciton; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: Depends on the input video signal.
Input Signal (VIDEO IN);
PAL COLOR BARS or SECAM COLOR BARS

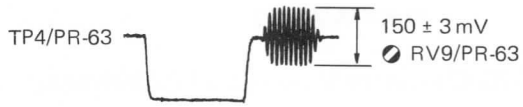
**Adjustment**




### 7-2-3. PAL Burst Level Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL COLOR BARS

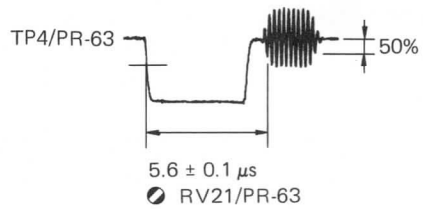
**Adjustment**



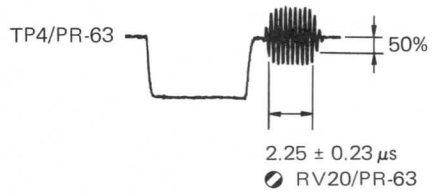

### 7-2-4. PAL Burst Position and Width Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL COLOR BARS

**Step 1. Burst position adjustment**




**Step 2. Burst width adjustment**

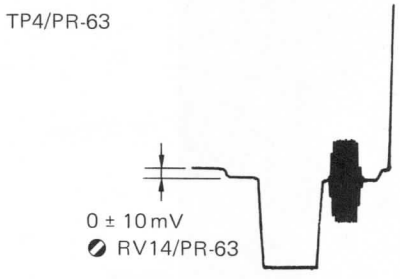


## 7-2-5. Black Level Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63 Depends on the input video signal.
Input Signal (VIDEO IN);
PAL COLOR BARS or SECAM COLOR BARS

Before goes into this adjustment, be sure to perform the DC offset adjustment referring to the section 7-1-3.

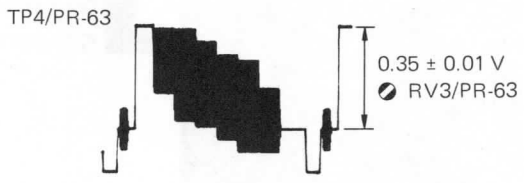
**Adjustment**




## 7-2-6. Video Level Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63 Depends on the input video signal.
Input Signal (VIDEO IN);
PAL COLOR BARS or SECAM COLOR BARS

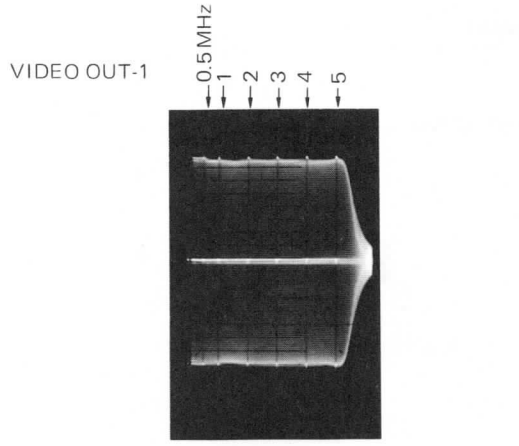
**Adjustment**




## 7-2-7. Frequency Response Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: Depends on the input video signal.
Input Signal (VIDEO IN);
PAL or SECAM FIELD RATE SWEEP
(Frequency Range Approx. 0.1 to 6 MHz)

**Step 1.**
**Adjustment**




OUTPUT LEVEL: 0.5 MHz = 4 MHz
CV1/PR-63

**Step 2.**
VTR
VIDEO OUT-1
OUTPUT LEVEL: 0.5 MHz = 2 MHz
RV4/PR-63

**Step 3.**
VTR
VIDEO OUT-1
OUTPUT LEVEL: 0.5 MHz to 5 MHz = LINEAR
RV6/PR-63

**Step 4.**
VTR
VIDEO OUT-1
OUTPUT LEVEL: 0.5 MHz to 5 MHz = FLAT
CV1/PR-63

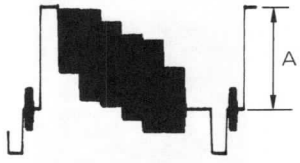
## 7-2-8. Video Level Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; REC → PLAY → VAR+1
Switch & Control Settings;
HEAD Selector: PLAY
PAL/SECAM Sel (S2)/PR-63: Depends on the input video signal.
Input Signal (VIDEO IN);
PAL or SECAM COLOR BARS

Make a recording of a COLOR BARS and play it back in "NORMAL" mode and in "VAR+1" mode.

**Adjustment**

TP4/PR-63



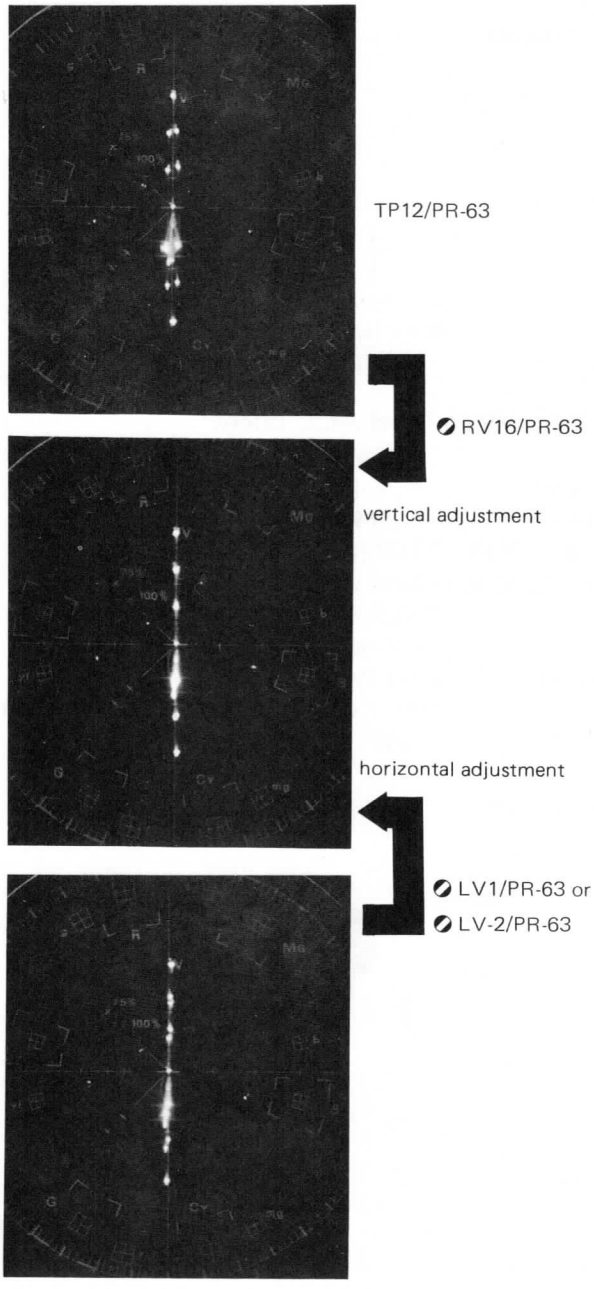

A in "NORMAL" = A in "VAR+1"
("NORMAL" is reference)
RV5/PR-63

## 7-2-9. PAL U–V Separation Adjustment

Connection; See section 5-3 connection 1.
Equipment; Vectorscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL COLOR BARS/RED

**Adjustment**

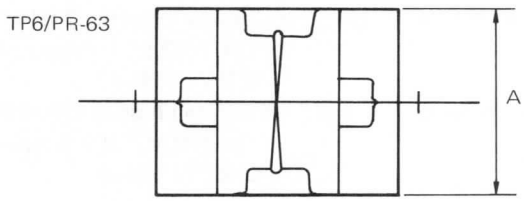
U and V spots should align on the vertical line and each spot should be overlapped.



## 7-2-10. PAL Decode Chroma Phase Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; REC → VAR+1
Switch & Control Settings;
HEAD Selector: PLAY
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL COLOR BARS/RED
Make a recording of a COLOR BARS and play it back in VAR+1 mode.

**Adjustment**

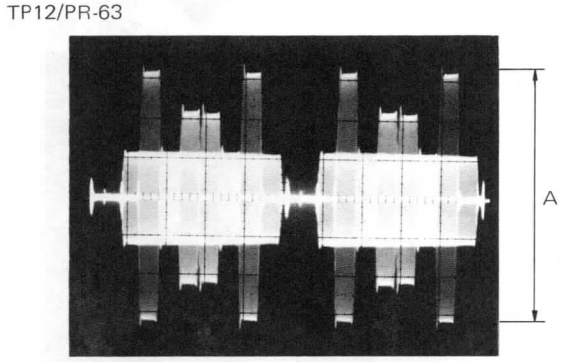



A = MAXIMUM
RV30/PR-63

## 7-2-11. PAL Decode Chroma Level Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL COLOR BARS/RED

**Adjustment**



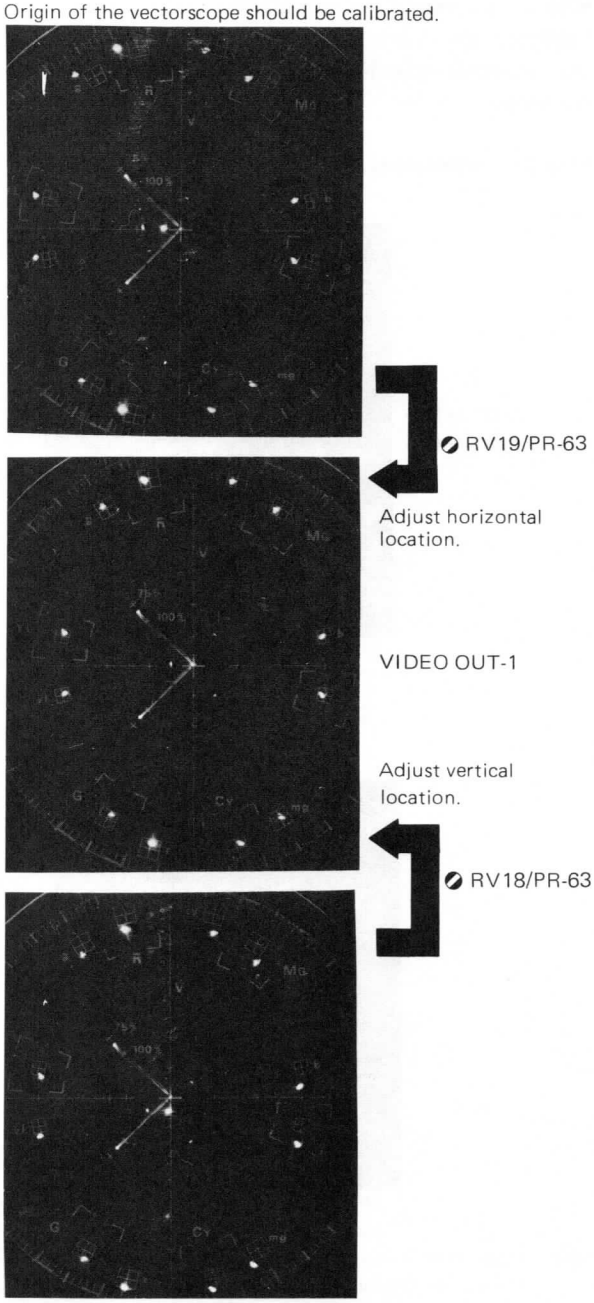

A = 0.7 ± 0.01 V
RV10/PR-63

## 7-2-12. Encoded Chroma Offset Adjustment

Connection; See section 5-3 connection 1.
Equipment; Vectorscope
Mode of VTR; REC → VAR+1
Switch & Control Settings;
HEAD Selector: PLAY
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN):
PAL COLOR BARS/RED
Make a recording of a COLOR BARS and play it back in VAR+1 mode.

**Adjustment**

Origin of the vectorscope should be calibrated.




**spec;** Each spot takes its specified place on the scope screen, precisely.

## 7-2-13. PAL V-Axis Encoder Gain Adjustment

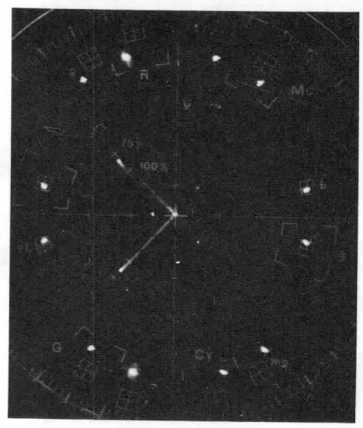
Connection; See section 5-3 connection 1.
Equipment; Vectorscope
Mode of VTR; REC → VAR+1
Switch & Control Settings;
HEAD Selector: PLAY
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL COLOR BARS/RED

Make a recording of a COLOR BARS and play it back in VAR+1 mode.

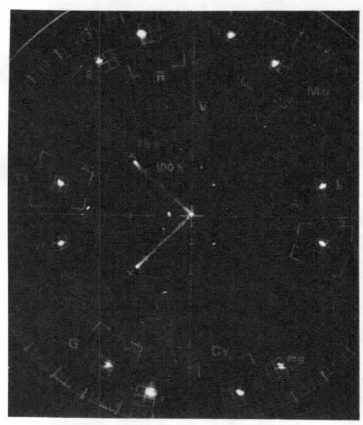
**Step 1. Vectorscope Calibration**
Calibrate the Vectorscope gain and phase, so that the yellow vector gets the originally predetermined location on the scope.

**Step 2. Adjustment**

VIDEO OUT-1
(Vectorscope)



⊘ RV17/PR-63



**spec;** Magenta spot and red spot take their specified place on the scope screen precisely.

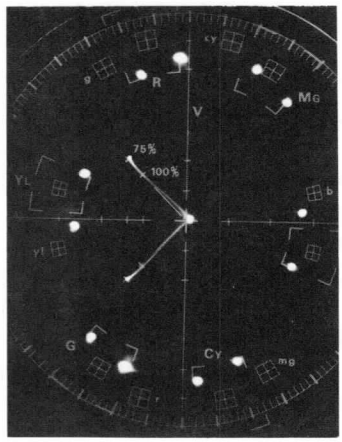
## 7-2-14. PAL Encoded Chroma Level and Phase Adjustment

Connection; See section 5-3 connection 1.
Equipment; Vectorscope
Mode of VTR; REC → PLAY → VAR+1
Switch & Control Settings;
HEAD Selector: PLAY
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL COLOR BARS/RED

Make a recording of a COLOR BARS and play it back in "NORMAL" mode and "VAR+1" mode alternately.

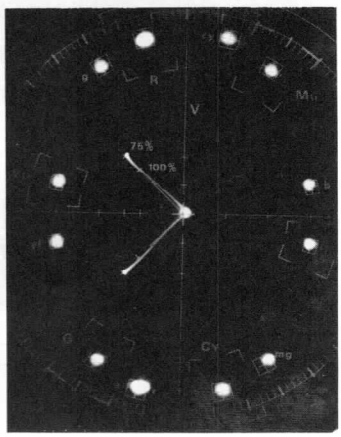
VIDEO OUT-1 (Vectorscope)
Chroma Level in "VAR+1" = Chroma Level in "NORMAL"
("NORMAL" is reference.)
⊘ RV13/PR-63
Chroma Phase in "VAR+1" = Chroma Phase in "NORMAL"
("NORMAL" is reference.)
⊘ RV12/PR-63

VIDEO OUT-1
(Vectorscope)
"VAR+1" PLAY



Level
⊘ RV13/PR-63
Phase
⊘ RV12/PR-63

"NORMAL" PLAY



## 7-2-15. PAL Chroma D/A Gain Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; REC → VAR+1
Switch & Control Settings;
HEAD Selector: R/P
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL COLOR BARS/RED

**Step 1.**
Set the REMOTE/LOCAL Switch (S1/PR-63) to LOCAL and set the VIDEO GAIN Control ◐ RV28/PR-63 to fully counterclockwise.

**Step 2.**
Make a recording of a COLOR BARS and play it back in "NORMAL" mode and "VAR+1" mode alternately.

**Adjustment**
VIDEO OUT-1 (Vectorscope)
Chroma Level in "VAR+1" = Chroma Level in "NORMAL"
("NORMAL" is referense)
◐ RV22/PR-63

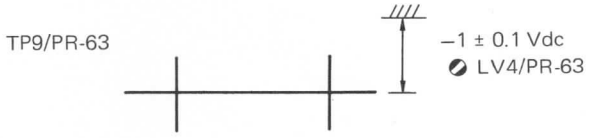
**Step 3.**
Set the REMOTE/LOCAL Switch (S1/PR-63) to REMOTE.

## 7-2-16. PAL Decode PLL Adjustment

Connection; See section 5-3 connection 2.
Equipment; Oscilloscope
Mode of VTR; REC → SHUTTLE+1
Switch & Control Settings;
HEAD Selector: PLAY
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL COLOR BARS

Make a recording of a COLOR BARS and play it back in SHUTTLE+1 mode.

**Adjustment**




## 7-2-17. PAL Slow Bidirex Decode Phase Adjustment

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; REC → SHUTTLE+4
Switch & Control Settings;
HEAD Selector: R/P
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL COLOR BARS

Make a recording of a COLOR BARS and play it back in SHUTTLE+4 mode.

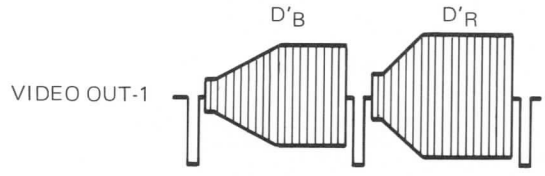
**Adjustment**
VIDEO OUT-1 (Vectorscope)
CHROMA LEVEL = MAXIMUM
◐ RV23/PR-63

## 7-2-18. SECAM ID Signal Level Adjustment

**For PR-63 Board No. 1-618-708-13 and up**

Connection; See section 5-3 connection 1.
Equipment; Oscilloscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: SECAM
Input Signal (VIDEO IN);
SECAM COLOR BARS

**Adjustment**

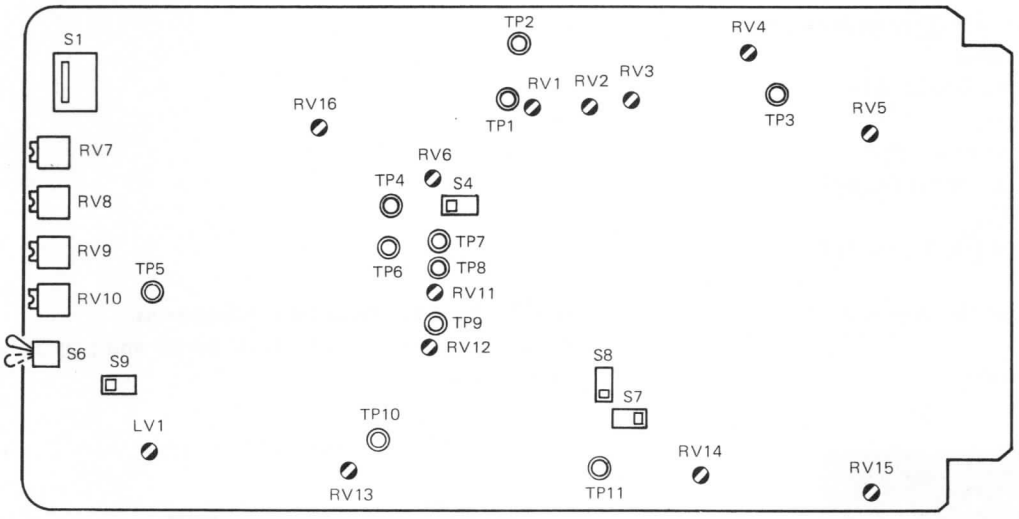



$D'_B = 500 \pm 50$ mVp-p
$D'_R = 540^{+40}_{-50}$ mVp-p
◐ RV24/PR-63

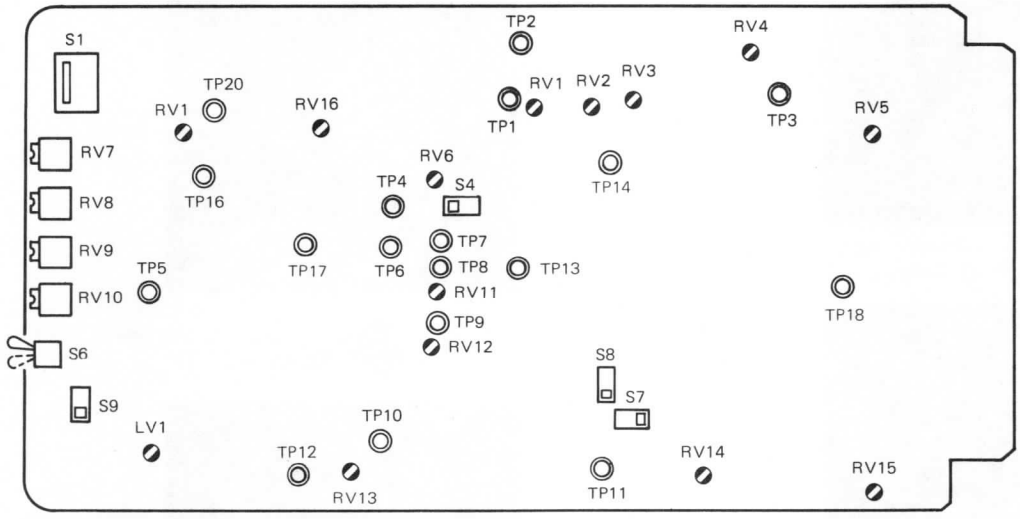
# SECTION 8
# OVERALL SYSTEM ALIGNMENT

## SG-17 Board

**1-615-707-11**




**1-615-707-12 & UP**



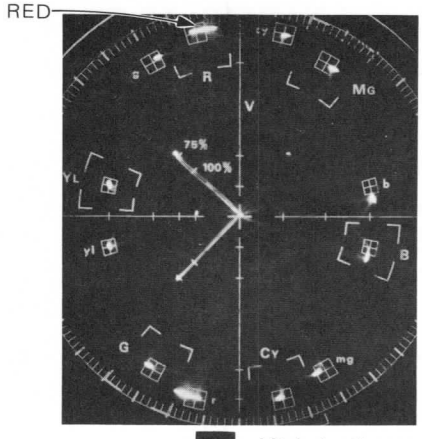
## 8-1. CHROMA CHARACTERISTICS ALIGNMENT

### 8-1-1. Velocity Error Compensator Adjustment

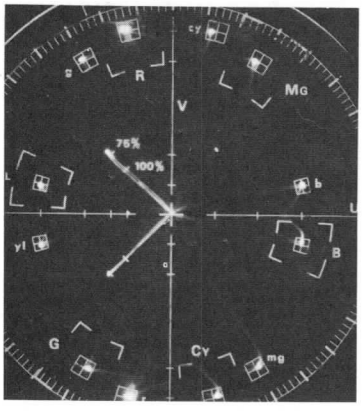
Connection; See section 5-3 connection 1.
Equipment; Vectorscope
Mode of VTR; STOP (Auto E-E), REC → PLAY
Switch & Control Settings;
HEAD Selector: R/P
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL COLOR BARS/RED

**Step 1. Velocity Error Offset Adjustment**

VIDEO OUT-1 (Vectorscope)




Minimize the spot size of RED
◐ RV15/SG-17

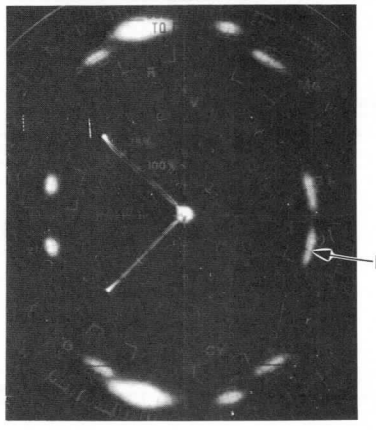



**Note:** Use DP mode of the vectorscope for precise adjustment, 0 ± 1.5°.

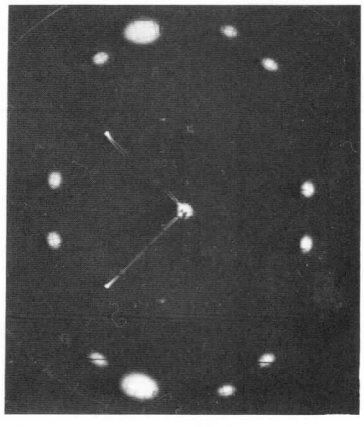
**Step 2. Velocity Error Gain Adjustment**

Make a recording of a COLOR BARS and play it back in NORMAL mode.

VIDEO OUT-1 (Vectorscope)




Minimize the spot size of BLUE
◐ RV14/SG-17



## 8-1-2. PAL Burst Chroma Phase Adjustment

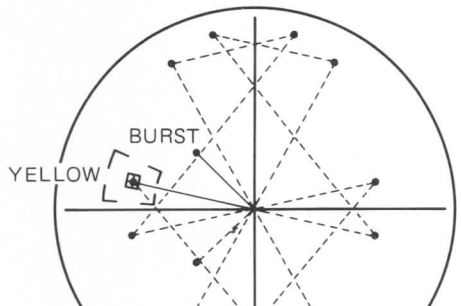
Connection; See section 5-3 connection 1.
Equipment; Vectorscope
Mode of VTR; REC → PLAY → STILL
Switch & Control Settings;
HEAD Selector: PLAY
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL COLOR BARS

**Step 1.**
Make a recording of a COLOR BARS and play it back in "NORMAL" mode and "STILL" mode.

**Adjustment**
VIDEO OUT-1 (Vectorscope)
CHROMA Phase in "NORMAL" = CHROMA Phase in "STILL"
("STILL" is reference.)
● RV3/SG-17

**Step 2.**
Play back recording in NORMAL mode.
Adjust the relative phase of BURST and YELLOW signal become as illustrated below on the vectorscope.
● RV2/SG-17

VIDEO OUT-1 (Vectorscope)

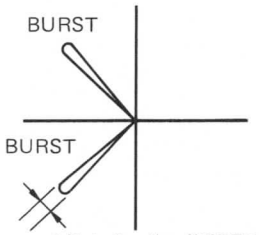



## 8-1-3. PAL Burst Tuning Adjustment

Connection; See section 5-3 connection 1.
Equipment; Vectorscope
Mode of VTR; STOP (Auto E-E)
Switch & Control Settings;
PAL/SECAM Sel (S2)/PR-63: PAL
Input Signal (VIDEO IN);
PAL COLOR BARS

**Adjustment**

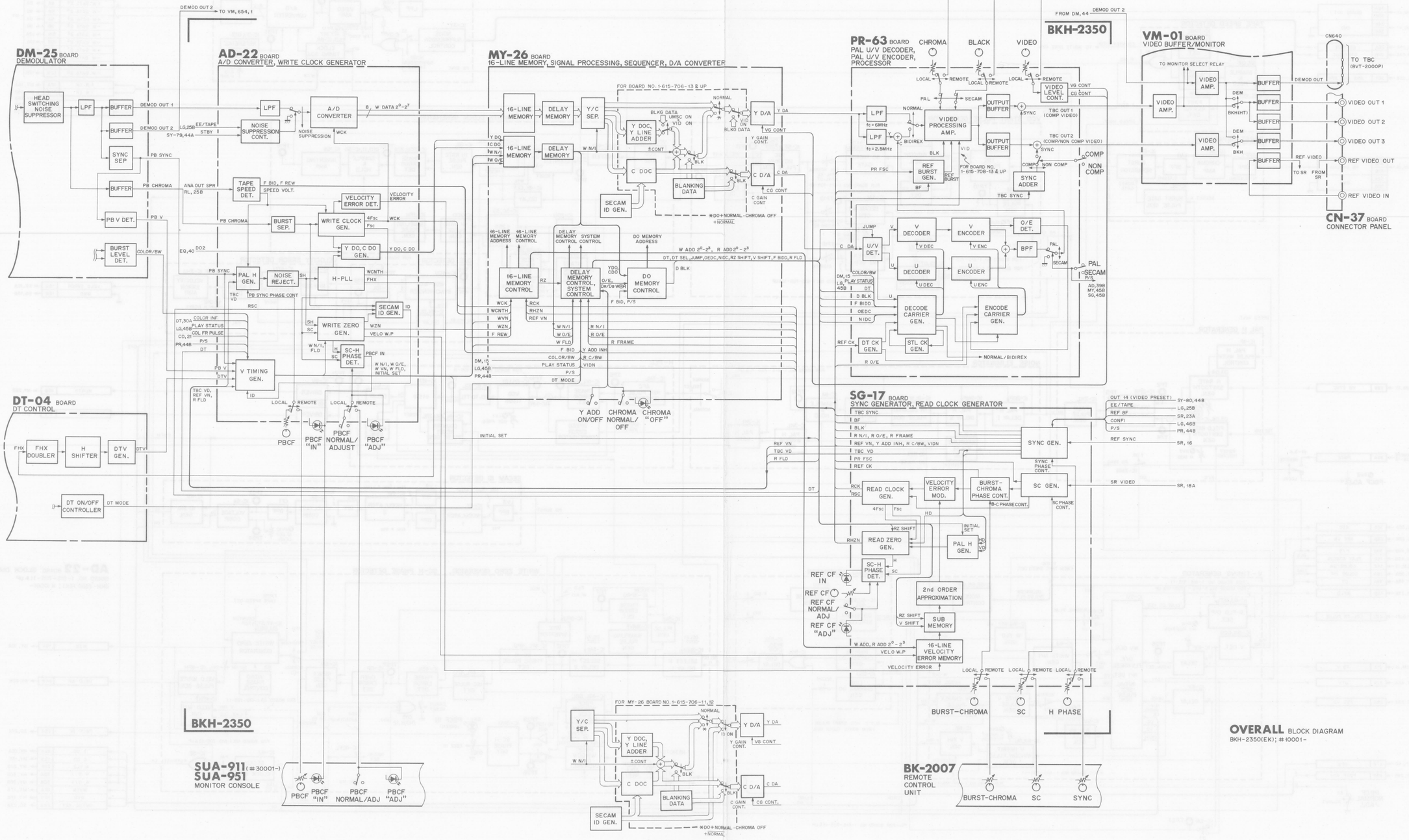
VIDEO OUT-1 (Vectorscope)




Minimize the JITTER
● LV1/SG-17

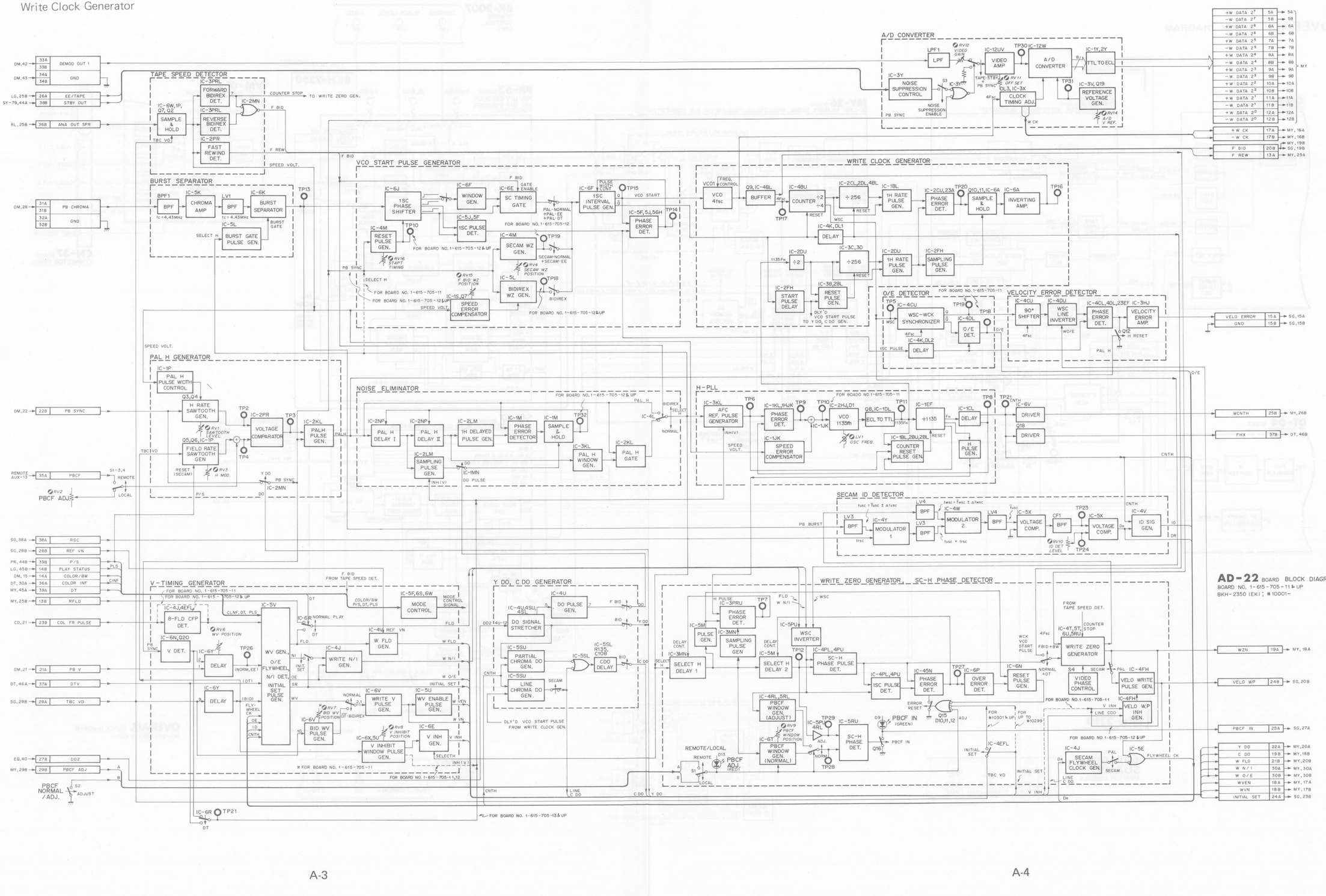
# SECTION A
# BLOCK DIAGRAMS

## OVERALL BLOCK DIAGRAM



## AD-22 BOARD

A/D Converter
Write Clock Generator



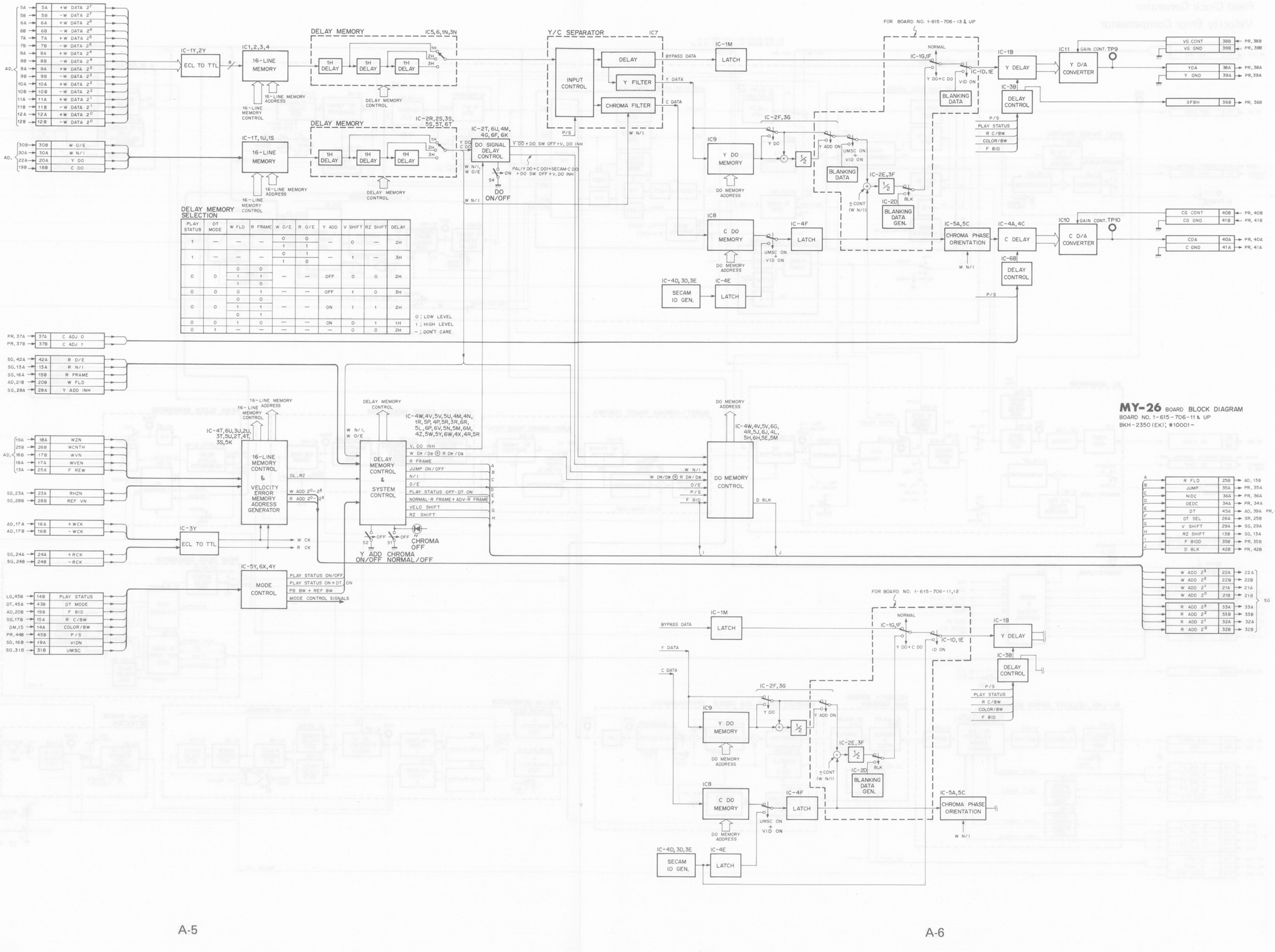





**AD-22** BOARD BLOCK DIAGRAM
BOARD NO. 1-615-705-11 & UP
BKH-2350 (EK) ; # 10001-

## MY-26 BOARD

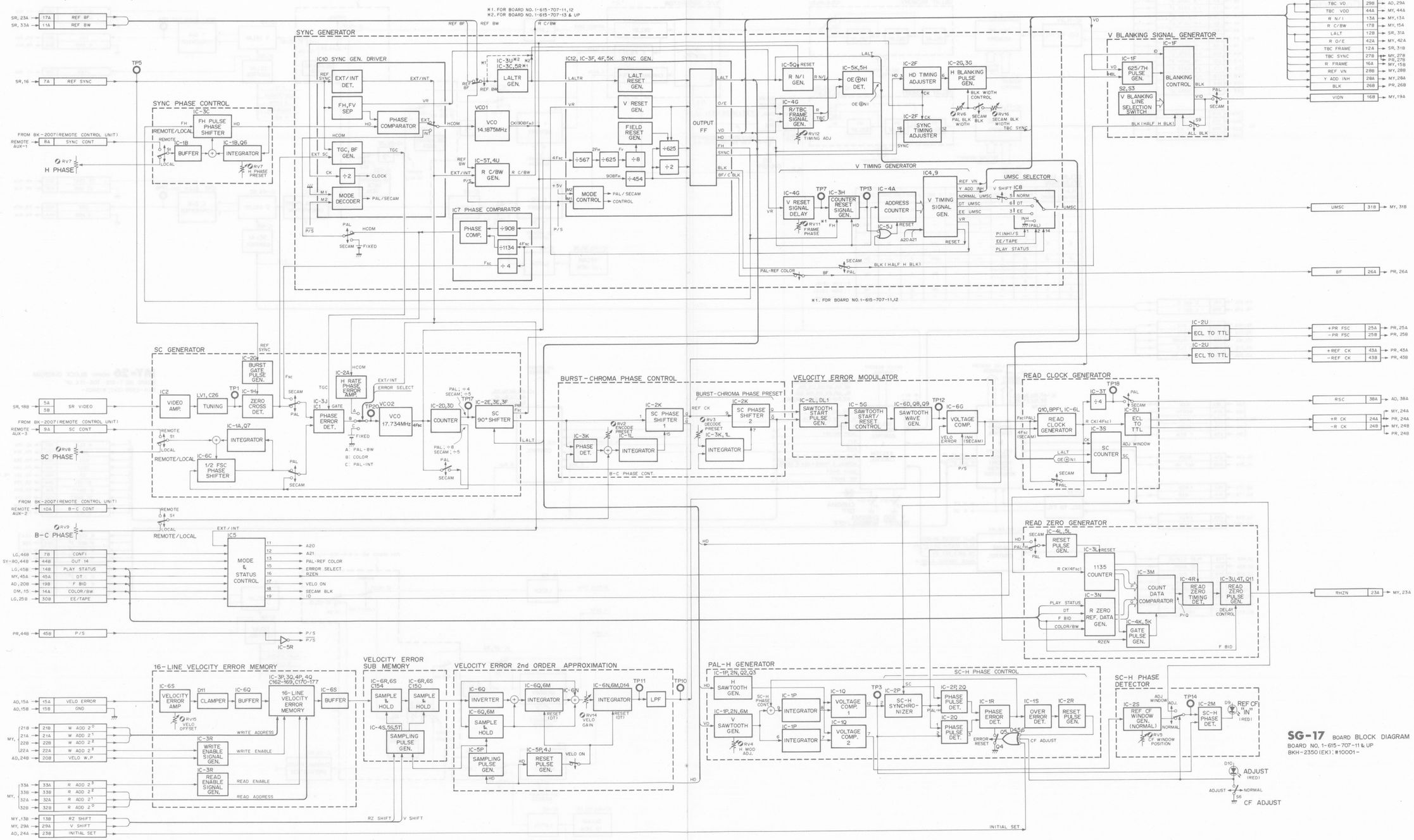
16-Line Memory
Sequencer
Dropout Compensator
D/A Converter




**MY-26** BOARD BLOCK DIAGRAM
BOARD NO. 1-615-706-11 & UP
BKH-2350(EK), #10001-

## SG-17 BOARD

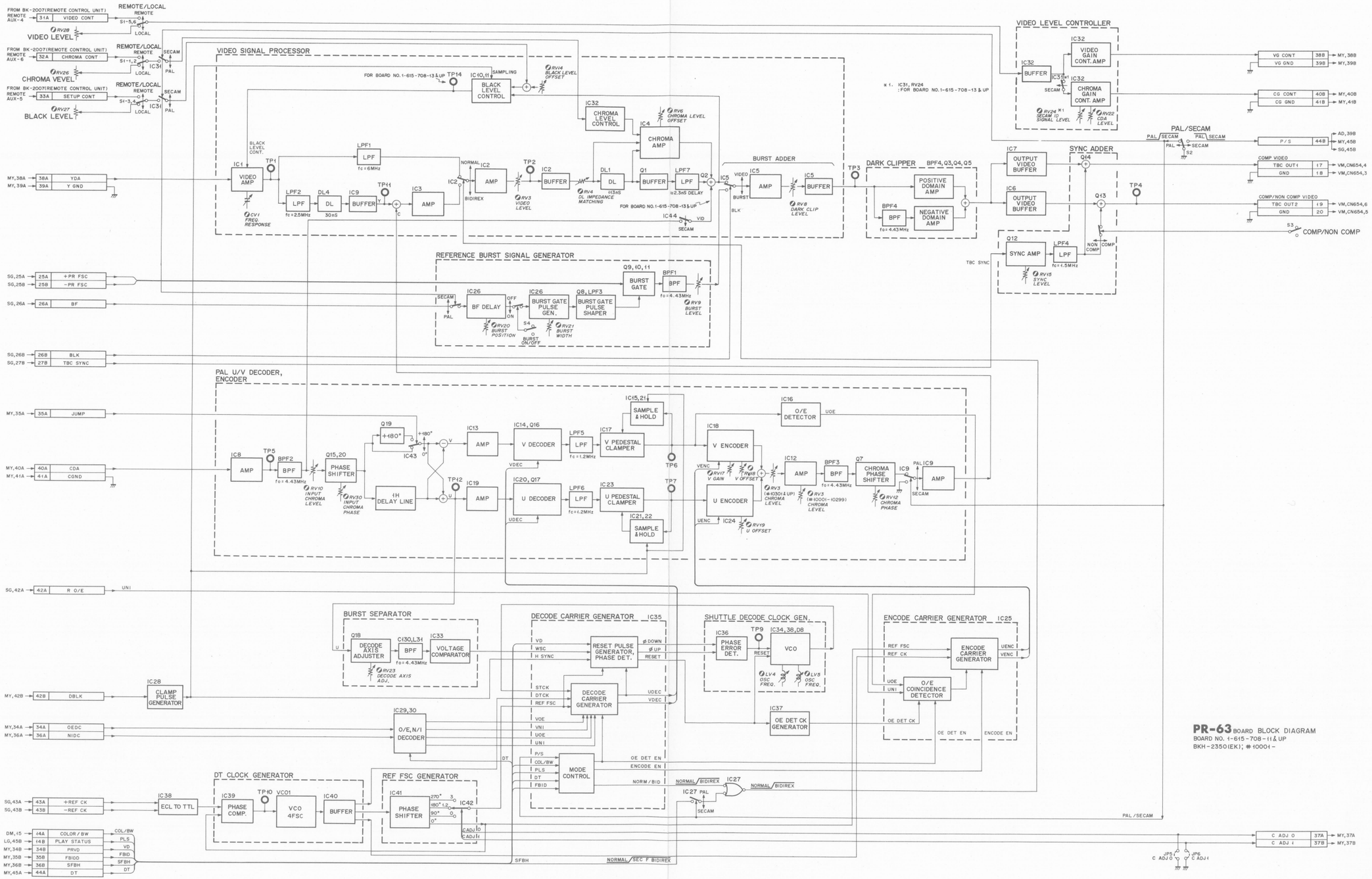
Sync Generator
Read Clock Generator
Velocity Error Compensator




**SG-17** BOARD BLOCK DIAGRAM
BOARD NO. 1-615-707-11 & UP
BKH-2350 (EK) : #10001-

## PR-63 BOARD

PAL U/V Decoder, Encoder
Processor



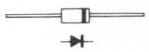

**PR-63** BOARD BLOCK DIAGRAM
BOARD NO. 1-615-708-11 & UP
BKH-2350(EK); #10001-

# SECTION B
# SEMICONDUCTOR PIN ASSIGNMENTS

The circuit diagram of each IC is obtained from the IC data book published by the manufacturer.

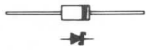

| TYPE | PAGE | TYPE | PAGE | TYPE | PAGE | TYPE | PAGE |
|---|---|---|---|---|---|---|---|
| 1S1555 | B-3 | 2SC945 | B-3 | CX23082 | B-13 | HD74LS10P | B-4 |
| 1S1585 | B-3 | 2SK105A-20 | B-3 | CX7930A | B-14 | HD74LS123P | B-21 |
| 1S1587 | B-3 | 2SK105A-30 | B-3 | CX7998 | B-15 | HD74LS153P | B-21 |
| 1S2076 | B-3 | 2SK523-L2 | B-3 | CXA1016D | B-16 | HD74LS157P | B-21 |
| 1S2473 | B-3 | 2SK523-M1 | B-3 | DTA114ES | B-3 | HD74LS221P | B-21 |
| 1SS119 | B-3 | 74F00PC | B-4 | DTA144ES | B-3 | HD74LS32P | B-21 |
| 1SS133 | B-3 | 74F04PC | B-4 | DTC114ES | B-3 | HD74LS74AP | B-22 |
| 1SS148 | B-3 | 74F10PC | B-4 | EQA02-08A | B-3 | HD74LS86P | B-4 |
| 1SS227 | B-3 | 74F193PC | B-4 | HD10101 | B-16 | HI1-0201-5 | B-22 |
| 1SS97-1 | B-3 | 74F283PC | B-4 | HD10102 | B-16 | HM6168HP-45 | B-22 |
| 1SV134 | B-3 | 74F86PC | B-4 | HD10105 | B-16 | HN27C64G-20 | B-29 |
| 1SV55 | B-3 | AM686HC | B-4 | HD10116 | B-16 | HZ5.1EB1 | B-3 |
| 1SZ52 | B-3 | BX1288 | B-5 | HD10124 | B-16 | HZ5.1EB2 | B-3 |
| 2SA1005 | B-3 | BX1289 | B-5 | HD10125 | B-16 | HZ5.1EB3 | B-3 |
| 2SA1027R | B-3 | BX1341 | B-5 | HD74ALS00P | B-4 | HZ6.8EB1 | B-3 |
| 2SA1048 | B-3 | BX1355 | B-6 | HD74HC00P | B-17 | HZ6.8EB2 | B-3 |
| 2SA1048GR | B-3 | BX365A | B-6 | HD74HC04P | B-17 | HZ6.8EB3 | B-3 |
| 2SA1115 | B-3 | BX366A | B-6 | HD74HC08P | B-17 | HZ7.5EB1 | B-3 |
| 2SA1175 | B-3 | BX381 | B-6 | HD74HC10P | B-17 | HZ7.5EB2 | B-3 |
| 2SA1206 | B-3 | BX3931A | B-6 | HD74HC11P | B-17 | HZ7.5EB3 | B-3 |
| 2SA733 | B-3 | CA3080E | B-6 | HD74HC123P | B-17 | MB4002 | B-22 |
| 2SA733P | B-3 | CA3102E | B-6 | HD74HC153P | B-17 | MB7112E | B-29 |
| 2SA933S-Q | B-3 | CX20051A | B-7 | HD74HC157P | B-18 | MB7134H | B-29 |
| 2SA933S-R | B-3 | CX20060 | B-6 | HD74HC163P | B-18 | MBM27C64-25 | B-29 |
| 2SA933S-S | B-3 | CX20158 | B-6 | HD74HC164P | B-18 | MC10101L | B-16 |
| 2SA995 | B-3 | CX20160 | B-7 | HD74HC174P | B-18 | MC10102L | B-16 |
| 2SB822 | B-3 | CX20161 | B-7 | HD74HC175P | B-18 | MC10105L | B-16 |
| 2SC1364 | B-3 | CX20162 | B-7 | HD74HC21P | B-19 | MC10115L | B-22 |
| 2SC1583 | B-3 | CX20163 | B-8 | HD74HC240P | B-19 | MC10116L | B-16 |
| 2SC1740 | B-3 | CX20164 | B-8 | HD74HC253P | B-19 | MC10124L | B-16 |
| 2SC2458 | B-3 | CX20165 | B-9 | HD74HC32P | B-19 | MC10125L | B-16 |
| 2SC2603 | B-3 | CX20167 | B-9 | HD74HC4040P | B-19 | MC1496M | B-22 |
| 2SC2603G | B-3 | CX20194 | B-9 | HD74HC4538P | B-20 | MC1496P | B-22 |
| 2SC2724 | B-3 | CX20195 | B-10 | HD74HC74P | B-20 | MC1595L | B-22 |
| 2SC2724-C | B-3 | CX20196 | B-10 | HD74HC86P | B-20 | MC1596G | B-22 |
| 2SC2785 | B-3 | CX20219 | B-11 | HD74HCT240P | B-19 | MC1648P | B-23 |
| 2SC2785-E | B-3 | CX20220-1DOT | B-11 | HD74LS00P | B-4 | MC74F00N | B-4 |
| 2SC2785-K | B-3 | CX23024 | B-11 | HD74LS02P | B-20 | MC74F04N | B-4 |
| 2SC2901 | B-3 | CX23038 | B-12 | HD74LS04P | B-4 | MC74F193N | B-4 |
| 2SC403SP | B-3 | CX23065 | B-12 | HD74LS08P | B-20 | MC74F74N | B-22 |

| TYPE | PAGE | TYPE | PAGE | TYPE | PAGE |
|---|---|---|---|---|---|
| MC74F86N | B-4 | SN74LS153N | B-21 | TC74HC175P | B-18 |
| MC74HC00N | B-17 | SN74LS157N | B-21 | TC74HC21P | B-19 |
| MC74HC04N | B-17 | SN74LS161AN | B-24 | TC74HC240P | B-19 |
| MC74HC08N | B-17 | SN74LS163AN | B-24 | TC74HC244P | B-26 |
| MC74HC10N | B-17 | SN74LS164N | B-24 | TC74HC253P | B-19 |
| MC74HC11N | B-17 | SN74LS174N | B-25 | TC74HC283P | B-27 |
| MC74HC153N | B-17 | SN74LS175N | B-25 | TC74HC32P | B-19 |
| MC74HC157N | B-18 | SN74LS20N | B-25 | TC74HC4040P | B-19 |
| MC74HC163N | B-18 | SN74LS221N | B-21 | TC74HC4538P | B-20 |
| MC74HC164N | B-18 | SN74LS240N | B-25 | TC74HC574F | B-27 |
| MC74HC174N | B-18 | SN74LS266N | B-25 | TC74HC688P | B-23 |
| MC74HC175N | B-18 | SN74LS283N | B-25 | TC74HC74F | B-20 |
| MC74HC21N | B-19 | SN74LS32N | B-21 | TC74HC74P | B-20 |
| MC74HC240N | B-19 | SN74LS33N | B-25 | TC74HC86F | B-20 |
| MC74HC253N | B-19 | SN74LS399N | B-26 | TC74HC86P | B-20 |
| MC74HC32N | B-19 | SN74LS688N | B-26 | TC74HCT240P | B-19 |
| MC74HC4040N | B-19 | SN74LS74AN | B-22 | TC74HCT244P | B-26 |
| MC74HC4538N | B-20 | SN74LS86N | B-4 | TC74HCT574P | B-27 |
| MC74HC688N | B-23 | SN75207BN | B-26 | TL082CP | B-27 |
| MC74HC74N | B-20 | SVC321-A2 | B-3 | TL084CN | B-27 |
| MC74HC86N | B-20 | SVC321SP-A2 | B-3 | TL592P | B-27 |
| MC74HCT240N | B-19 | TC74HC00F | B-17 | TL607CP | B-27 |
| MC931 | B-3 | TC74HC00P | B-17 | TLG124A | B-3 |
| N74F00N | B-4 | TC74HC02F | B-26 | TLR124 | B-3 |
| N74F04N | B-4 | TC74HC04F | B-17 | TMM2015AP-90 | B-27 |
| N74F86N | B-4 | TC74HC04P | B-17 | uA733CN | B-28 |
| NE527N | B-23 | TC74HC08F | B-17 | uA796PC | B-22 |
| NJM1496M | B-22 | TC74HC08P | B-17 | uPA54H | B-28 |
| NJM2903D | B-23 | TC74HC10F | B-17 | uPA64H | B-28 |
| NJM555D | B-23 | TC74HC10P | B-17 | uPC1037H | B-28 |
| RD6.8EB | B-3 | TC74HC11P | B-17 | uPC319C | B-28 |
| RD7.5E | B-3 | TC74HC123P | B-17 | uPC358C | B-28 |
| SN74ALS00AN | B-4 | TC74HC153F | B-17 | uPC393C | B-23 |
| SN74ALS574N | B-24 | TC74HC153P | B-17 | uPC4082C | B-27 |
| SN74LS00N | B-4 | TC74HC157P | B-18 | uPC4557C | B-28 |
| SN74LS02N | B-20 | TC74HC161F | B-26 | uPD4051BC | B-28 |
| SN74LS04N | B-4 | TC74HC163P | B-18 | | |
| SN74LS08N | B-20 | TC74HC164P | B-18 | | |
| SN74LS10N | B-4 | TC74HC174P | B-18 | | |
| SN74LS123N | B-21 | TC74HC175F | B-18 | | |

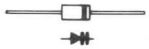


1S1555
1S1585
1S1587
1S2076
1S2473
1SS119
1SS133
1SS148

1SS227
MC931

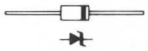


1SS97



1SV134

1SV55

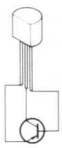


1SZ52
EQA02- ? ? ?
HZ ? ?EB
RD ? ?EB

SVC321A2

SVC321SPA2

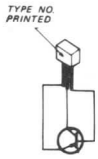
TLG124 ; GREEN
TLG124A ; GREEN
TLR124 ; RED



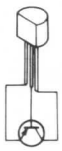
2SA1005
2SA733
2SA733-P
2SA933

2SA1027R

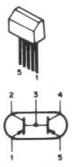
2SA1048
2SA1115



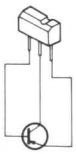

2SA1175



2SA1206

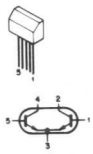



2SA995



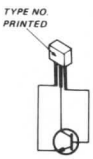
2SB822

2SC1364
2SC1740
2SC945



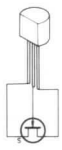

2SC1583

2SC2458
2SC2603
2SC2603G
2SC2724
2SC403SP

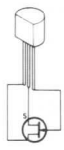



2SC2785
2SC2785E
2SC2785K

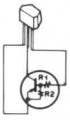
2SC2901



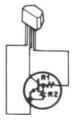
2SK105A



2SK523

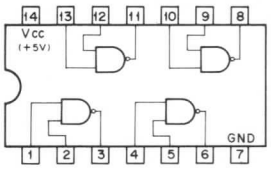


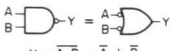
DTA114ES (R1=10K, R2=10K)
DTA144ES (R1=47K, R2=47K)



DTC114ES (R1=10K, R2=10K)

74F00PC (FSC)
HD74ALS00P (HITACHI)
HD74LS00P (HITACHI)
MC74F00N (MOTOROLA)
N74F00N (SIGNETICS)
SN74ALS00AN (TI)
SN74LS00N (TI)
TTL 2-INPUT POSITIVE-NAND GATE
— TOP VIEW —

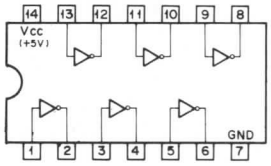


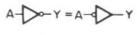




| A | B | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

0 ; LOW LEVEL
1 ; HIGH LEVEL

74F04PC (FSC)
HD74LS04P (HITACHI)
MC74F04N (MOTOROLA)
N74F04N (SIGNETICS)
SN74LS04N (TI)
TTL INVERTER
— TOP VIEW —

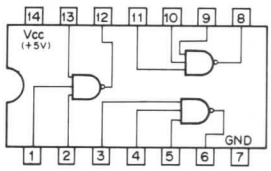


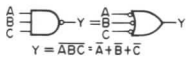




| A | Y |
|---|---|
| 0 | 1 |
| 1 | 0 |

0 ; LOW LEVEL
1 ; HIGH LEVEL

74F10PC (FSC)
HD74LS10P (HITACHI)
SN74LS10N (TI)
TTL 3-INPUT POSITIVE NAND GATE
— TOP VIEW —

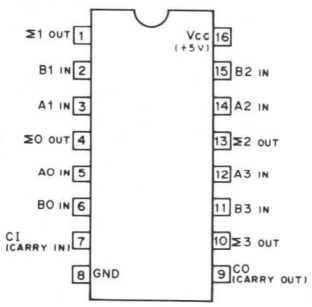


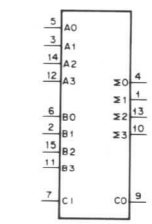




| A | B | C | Y |
|---|---|---|---|
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 0 |

0 : LOW LEVEL
1 : HIGH LEVEL

74F283PC (FSC)
TTL 4-BIT BINARY FULL ADDER
— TOP VIEW —

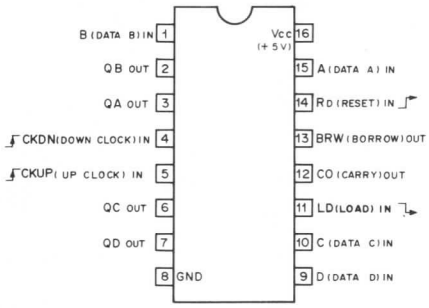


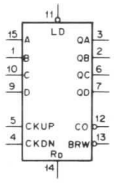




| | $2^4$ | $2^3$ | $2^2$ | $2^1$ | $2^0$ | |
|---|---|---|---|---|---|---|
| | | | | | CI | CARRY IN |
| | | A3 | A2 | A1 | A0 | DATA A IN |
| + | | B3 | B2 | B1 | B0 | DATA B IN |
| | CO | Σ3 | Σ2 | Σ1 | Σ0 | CARRY & SUM OUT |

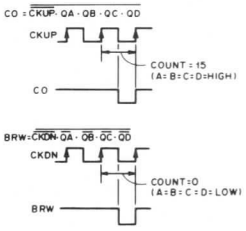
| EX. | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | 1 | CI |
| | 1 | 0 | 1 | 1 | A | |
| + | 1 | 0 | 1 | 0 | B | |
| | 1 | 0 | 1 | 1 | 0 | OUTPUTS |
| | CO | Σ3 | Σ2 | Σ1 | Σ0 | |

74F193PC (FSC)
MC74F193N (MOTOROLA)
TTL PRESETTABLE SYNCHRONOUS 4-BIT UP/DOWN COUNTER
— TOP VIEW —




| CONTROL INPUTS | | | | MODE |
|---|---|---|---|---|
| RD | LD | CKUP | CKDN | |
| 1 | X | X | X | RESET TO ZERO |
| 0 | 0 | X | X | PRESET |
| 0 | 1 | ↑ | 1 | UP COUNT |
| 0 | 1 | 1 | ↑ | DOWN COUNT |
| 0 | 1 | 1 | 1 | NO COUNT |

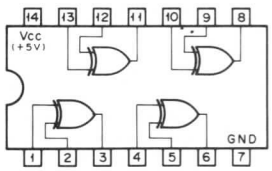



| COUNT | OUTPUTS | | | |
|---|---|---|---|---|
| | QD | QC | QB | QA |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 2 | 0 | 0 | 1 | 0 |
| 3 | 0 | 0 | 1 | 1 |
| 4 | 0 | 1 | 0 | 0 |
| 5 | 0 | 1 | 0 | 1 |
| 6 | 0 | 1 | 1 | 0 |
| 7 | 0 | 1 | 1 | 1 |
| 8 | 1 | 0 | 0 | 0 |
| 9 | 1 | 0 | 0 | 1 |
| 10 | 1 | 0 | 1 | 0 |
| 11 | 1 | 0 | 1 | 1 |
| 12 | 1 | 1 | 0 | 0 |
| 13 | 1 | 1 | 0 | 1 |
| 14 | 1 | 1 | 1 | 0 |
| 15 | 1 | 1 | 1 | 1 |

UP COUNT
DOWN COUNT

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

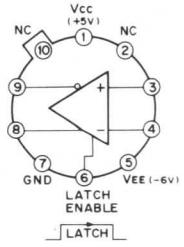
74F86PC (FSC)
HD74LS86P (HITACHI)
MC74F86N (MOTOROLA)
SN74LS86N (TI)
TTL EXCLUSIVE OR GATE
— TOP VIEW —



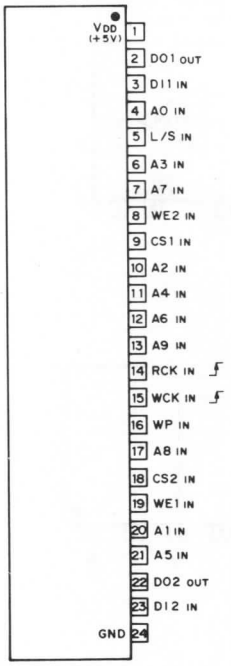
| A | B | Y |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

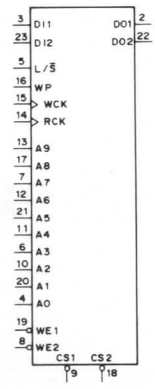
0 ; LOW LEVEL
1 ; HIGH LEVEL

AM686HC (ADVANCED MICRO DEVICE)
VOLTAGE COMPARATOR
— TOP VIEW —

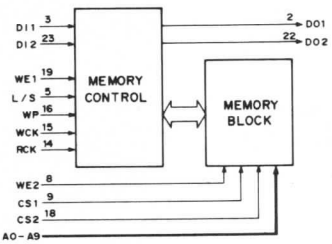


BX1288 (SONY)
C-MOS LINE MEMORY (16-LINEx2-BIT) WITH TTL INPUTS/OUTPUTS
— SIDE VIEW —

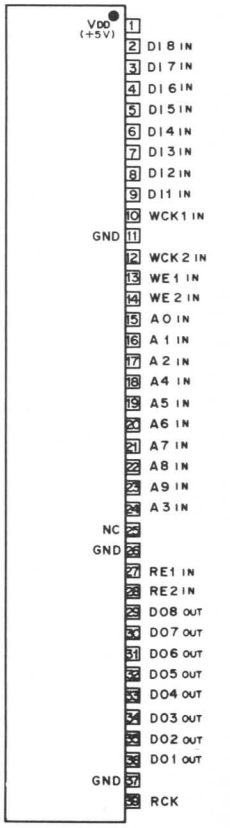


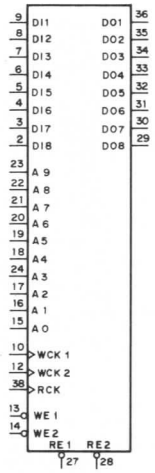




A0-9; MEMORY ADDRESS INPUTS
CS1,CS2;
CHIP SELECT SIGNAL INPUTS
DI1,2; DATA INPUTS
DO1,2; DATA OUTPUTS
L/S ; SHIFT REGISTOR LOAD/SHIFT
SIGNAL INPUT
H: LOAD, L: SHIFT
RCK; READ CLOCK INPUT
WCK; WRITE CLOCK INPUT
WE1,2; WRITE ENABLE SIGNAL INPUT
WP; WRITE PULSE INPUT

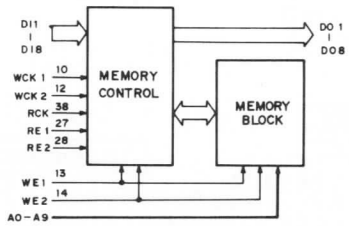



BX1289 (SONY)
C-MOS LINE MEMORY (1-LINEx8-BIT) WITH TTL INPUTS/OUTPUTS
— SIDE VIEW —

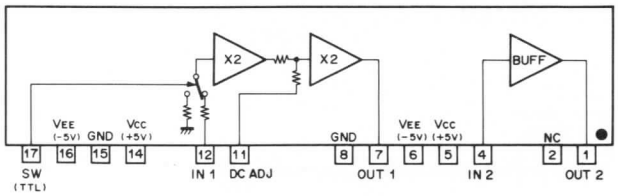



A0-9; MEMORY ADDRESS INPUTS
DI1-8; DATA INPUTS
DO1-8; DATA OUTPUTS
RCK; READ CLOCK INPUT
RE1,2; READ ENABLE INPUTS
WCK1,2; WRITE CLOCK INPUTS



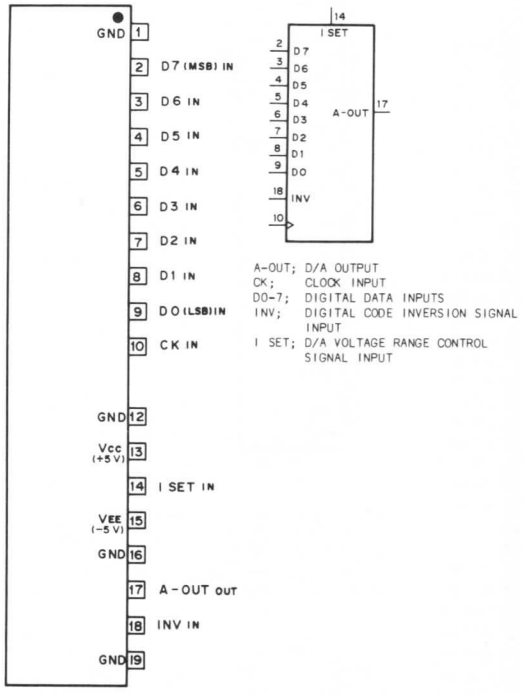

BX1341 (SONY)
VIDEO AMPLIFIERS AND BUFFER FOR SAMPLE/HOLD PROCESSING
— SIDE VIEW —



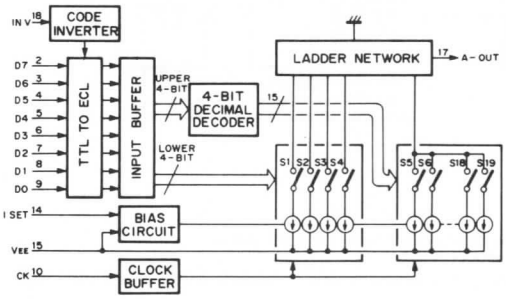

| SW | VIDEO AMP IN |
|---|---|
| 0 | GND |
| 1 | IN 1 |

0;LOW LEVEL
1;HIGH LEVEL

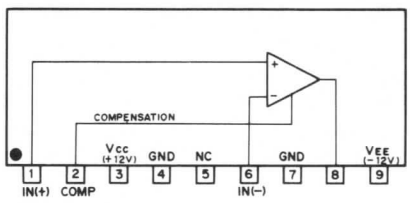
BX1355 (SONY)
8-BIT D/A CONVERTER WITH INPUT DATA CODE INVERTER (TTL INPUT)
— SIDE VIEW —



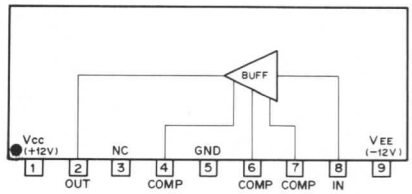

A-OUT; D/A OUTPUT
CK; CLOCK INPUT
D0-7; DIGITAL DATA INPUTS
INV; DIGITAL CODE INVERSION SIGNAL INPUT
I SET; D/A VOLTAGE RANGE CONTROL SIGNAL INPUT



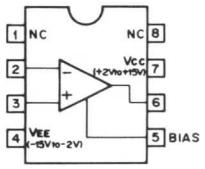

BX365A (SONY)
VIDEO AMPLIFIER
— SIDE VIEW —



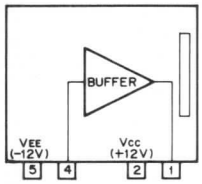

BX366A (SONY)
VIDEO BUFFER
— SIDE VIEW —



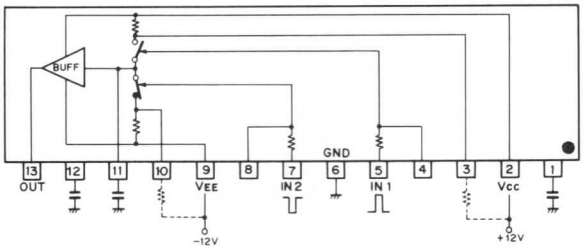

CA3080E (RCA)
OPERATIONAL AMPLIFIER
— TOP VIEW —

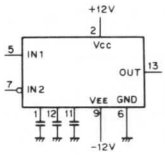



BX3931 (SONY)
BX3931A (SONY)
HYBRID VIDEO WIDEBAND BUFFER AMPLIFIER
— IMPRINTED SIDE —

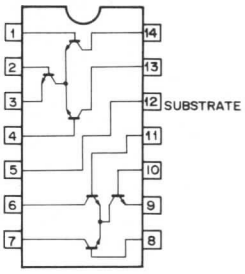



BX381 (SONY)
PHASE COMPARATOR
— SIDE VIEW —

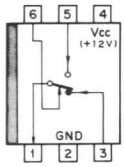



CA3102E (RCA)
HIGH FREQ.DIFFERNTIAL AMPLIFIER
— TOP VIEW —

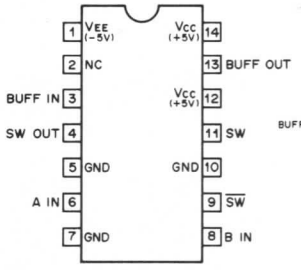


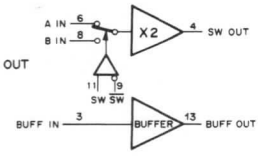

CX20060 (SONY)
ANALOG SWITCH
— TOP VIEW —




| CONT. INPUT (PIN 6) | SW |
|---|---|
| LOW OR OPEN | |
| HIGH | |

CX20158 (SONY)
VIDEO SWITCHER AND BUFFER
— TOP VIEW —



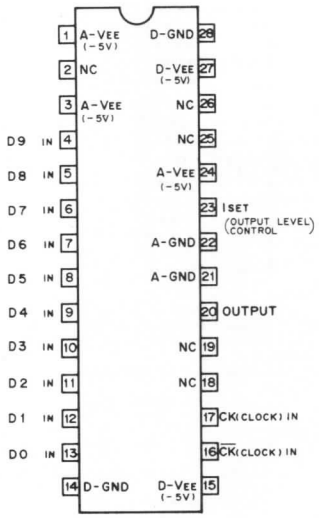

| SW | $\overline{SW}$ | INPUT |
|---|---|---|
| 0 | 0 | — |
| 0 | 1 | B |
| 1 | 0 | A |
| 1 | 1 | — |

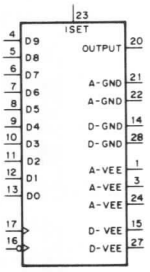
0 ; LOW LEVEL
1 ; HIGH LEVEL
— ; INDEFINITE

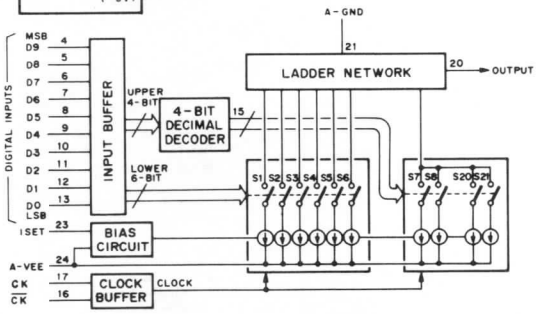
## CX20051A (SONY)

10-BIT D/A CONVERTER (ECL INPUT)

— TOP VIEW —



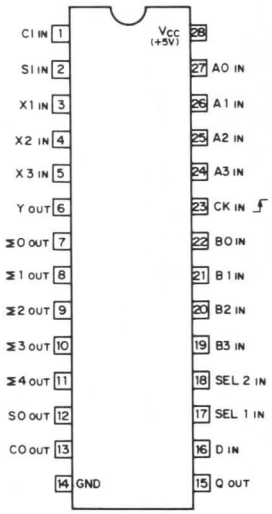



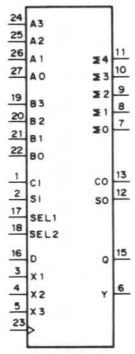




## CX20161 (SONY)

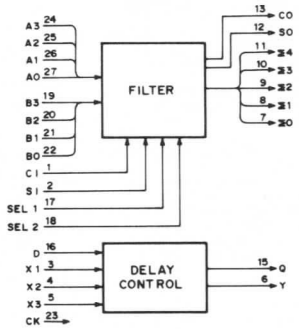
TTL 4-BIT LINE ADDER

— TOP VIEW —



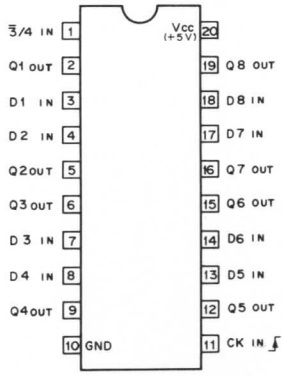

CI ; CARRY INPUT OF 4-BIT ADDER
CO ; CARRY OUTPUT OF 4-BIT ADDER
SI ; DATA B SHIFT SIGNAL INPUT
SO ; DATA B SHIFT SIGNAL OUTPUT

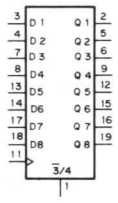



## CX20160 (SONY)

TTL OCTAL 3 OR 4 STAGE SHIFT REGISTER

— TOP VIEW —



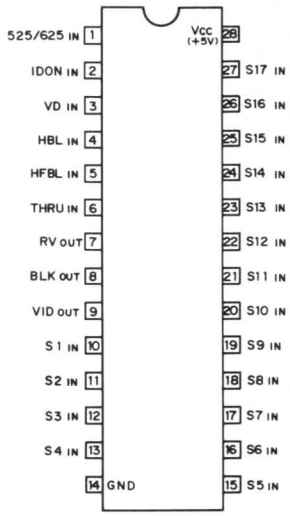



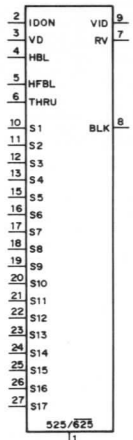

3/4; TOTAL STAGE SELECTION SIGNAL INPUT
H: 4 STAGES, L: 3 STAGES

## CX20162 (SONY)

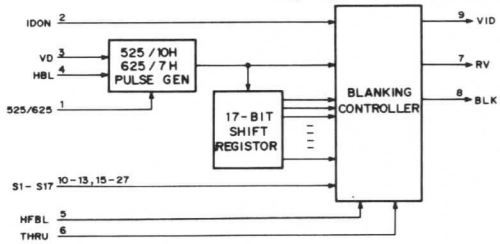
BIPOLAR/TTL VERTICAL BLANKING WIDTH CONTROLLER

— TOP VIEW —

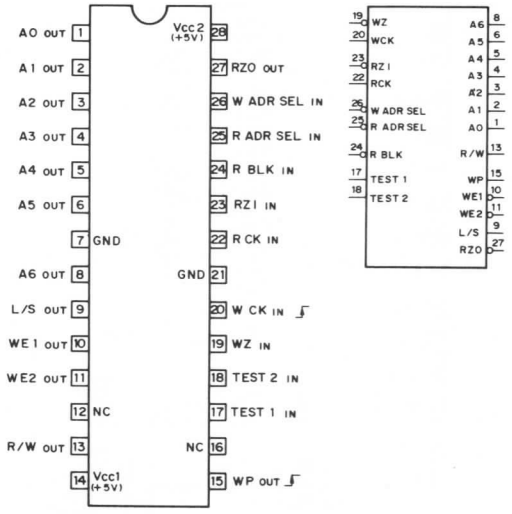


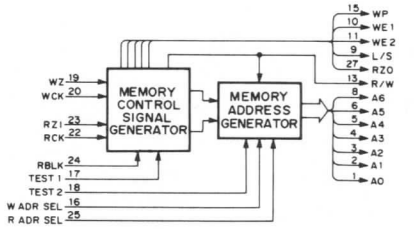

525/625;
525 LINES/625 LINES SETTING INPUT
IDON; SECAM ID ON/OFF SIGNAL INPUT
HBL; H BLANKING SIGNAL INPUT
HFBL; HALF H BLANKING SIGNAL INPUT
THRU; FORCIBLE BLANKING SIGNAL INPUT
S1-S17;
BLANKING LINE SELECTION SWITCH INPUTS
RV; 14TH LINE TIMING SIGNAL OUTPUT
BLK; BLANKING SIGNAL OUTPUT
VID; SECAM ID TIMING SIGNAL OUTPUT



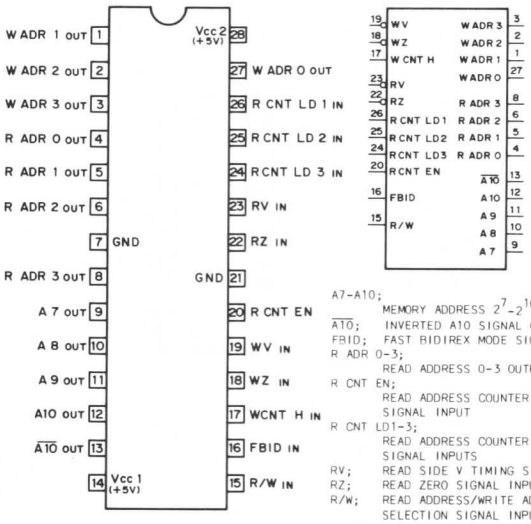
CX20163 (SONY)
BIPOLAR MAIN MEMORY CONTROLLER
— TOP VIEW —



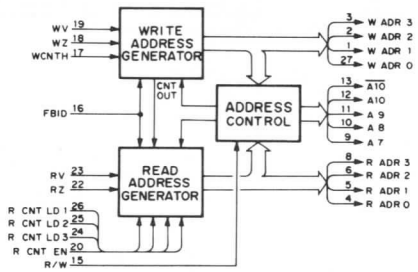

A0-A6; MEMORY ADDRESS $2^0$-$2^6$ OUTPUTS
L/S; LOAD/SHIFT CONTROL SIGNAL OUTPUT
R ADR SEL; READ ADDRESS SELECTION SIGNAL INPUT
RBLK; READ BLANKING SIGNAL INPUT
RCK; READ CLOCK INPUT
RZI; READ ZERO SIGNAL INPUT
RZO; READ ZERO SIGNAL OUTPUT
R/W; READ ADDRESS/WRITE ADDRESS SELECTION SIGNAL OUTPUT
TEST1,2; TEST MODE SIGNAL INPUTS
W ADR SEL; WRITE ADDRESS SELECTION SIGNAL INPUT
WCK; WRITE CLOCK INPUT
WE1,2; WRITE ENABLE SIGNAL OUTPUTS FOR RAM
WEN2 IS THE SAME SIGNAL AS WEN1.
WP; MEMORY WRITE PULSE OUTPUT
WZ; WRITE ZERO SIGNAL INPUT




CX20164 (SONY)
BIPOLAR LINE ADDRESS CONTROLLER
— TOP VIEW —



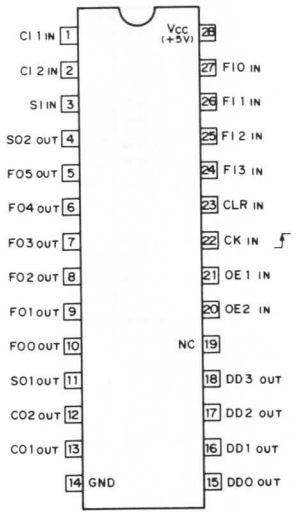

A7-A10; MEMORY ADDRESS $2^7$-$2^{10}$ OUTPUTS
$\overline{A10}$; INVERTED A10 SIGNAL OUTPUT
FBID; FAST BIDIREX MODE SIGNAL INPUT
R ADR 0-3; READ ADDRESS 0-3 OUTPUTS
R CNT EN; READ ADDRESS COUNTER ENABLE SIGNAL INPUT
R CNT LD1-3; READ ADDRESS COUNTER LOAD SIGNAL INPUTS
RV; READ SIDE V TIMING SIGNAL INPUT
RZ; READ ZERO SIGNAL INPUT
R/W; READ ADDRESS/WRITE ADDRESS SELECTION SIGNAL INPUT
W ADR 0-3; WRITE ADDRESS 0-3 OUTPUTS
WCNT H; COUNTER H-SIGNAL INPUT
IT IS A H TIMING SIGNAL GENERATED BY WCK AFC COUNTER OUT.
WV; WRITE SIDE V TIMING SIGNAL INPUT
WZ; WRITE ZERO SIGNAL INPUT

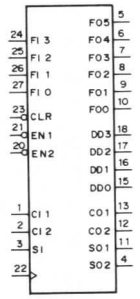


CX20165 (SONY)

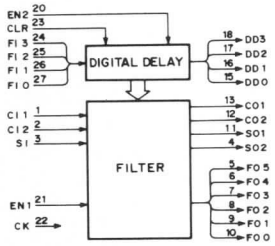
TTL 4TH ORDER DIGITAL FILTER WITH 3-STATE OUTPUTS

— TOP VIEW —



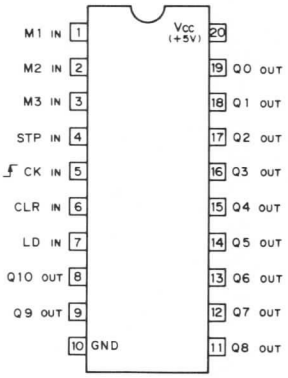

FI0-FI3;
DIGITAL FILTER INPUTS
DD0-DD3;
FI DATA WITH A DELAY OF 5D OUTPUT (3-STATE)
FO0-FO5;
DIGITAL FILTER OUTPUTS (3-STATE)
CI1,2; CARRY INPUTS
CO1,2; CARRY OUTPUTS
SI; SHIFT DATA INPUT
SO1,2; SHIFT DATA OUTPUTS
EN1,2; OUTPUT ENABLE INPUTS
WHEN EN 1 OR 2 IS "H", EACH OUTPUT IS Hi-IMPEDANCE.

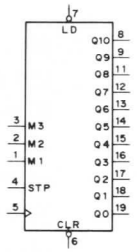



CX20194 (SONY)

BIPOLAR 11-BIT SYNCHRONOUS BINARY COUNTER

— TOP VIEW —

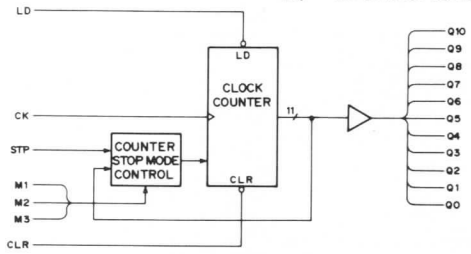



| M3 | M2 | M1 | COUNT * |
|---|---|---|---|
| 0 | 0 | 0 | 909 |
| 0 | 0 | 1 | 910 |
| 0 | 1 | 0 | 1024 |
| 0 | 1 | 1 | 1135 |
| 1 | 0 | 0 | 525 |
| 1 | 0 | 1 | 625 |
| 1 | 1 | 0 | 1125 |
| 1 | 1 | 1 | 2048 |

*; DECIMAL NUMBER
0; LOW LEVEL
1; HIGH LEVEL

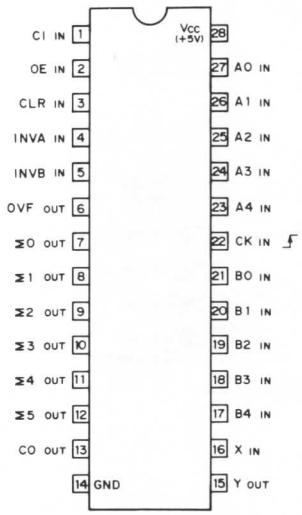
M1,M2,M3;
COUNT LIMIT SETTING SIGNAL INPUT
STP; COUNTER STOP MODE CONTROL INPUT
CLR; SYNCHRONOUS COUNTER CLEAR INPUT
LD; ASYNCHRONOUS COUNTER LOAD INPUT

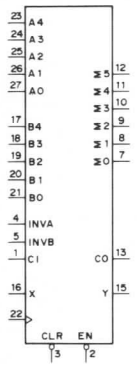



CX20167 (SONY)

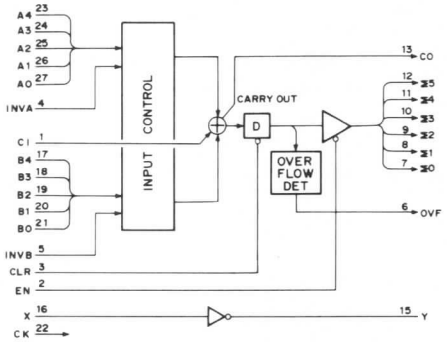
TTL 5-BIT FULL ADDER WITH 3-STATE OUTPUTS

— TOP VIEW —

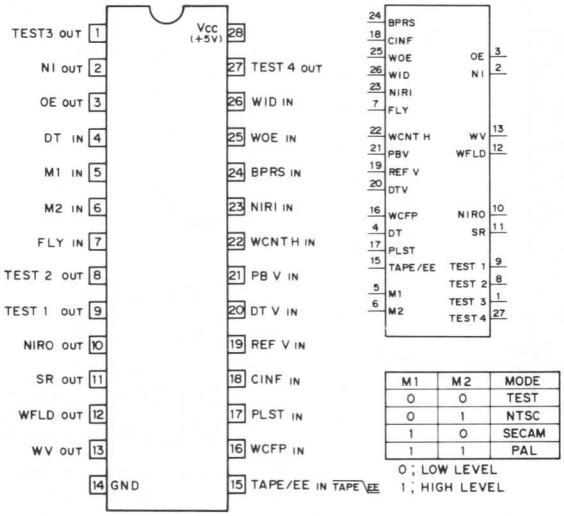



INVA, INVB;
LOGIC LEVEL INVERSION SIGNAL INPUTS
OVF; OVER FLOW SIGNAL OUTPUT
EN; OUTPUT ENABLE SIGNAL INPUT
WHEN EN IS "H", THE OUTPUTS ARE Hi-IMPEDANCE.



CX20195 (SONY)
BIPOLAR COLOR FRAMING DETECTOR
— TOP VIEW —

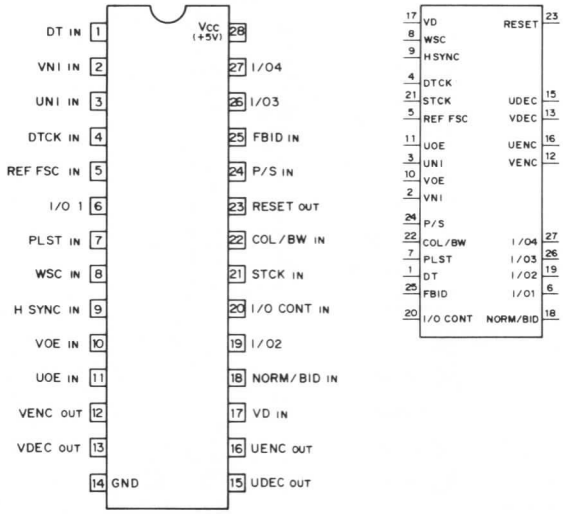



| M1 | M2 | MODE |
|---|---|---|
| 0 | 0 | TEST |
| 0 | 1 | NTSC |
| 1 | 0 | SECAM |
| 1 | 1 | PAL |

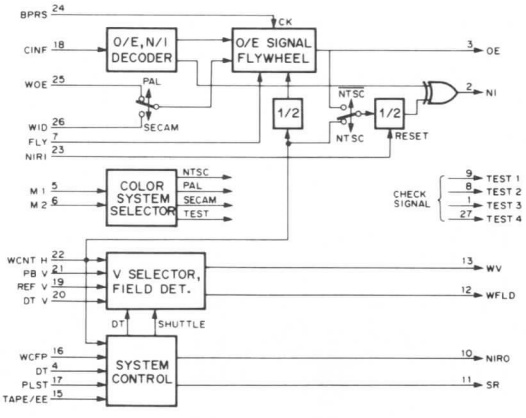
0 ; LOW LEVEL
1 ; HIGH LEVEL

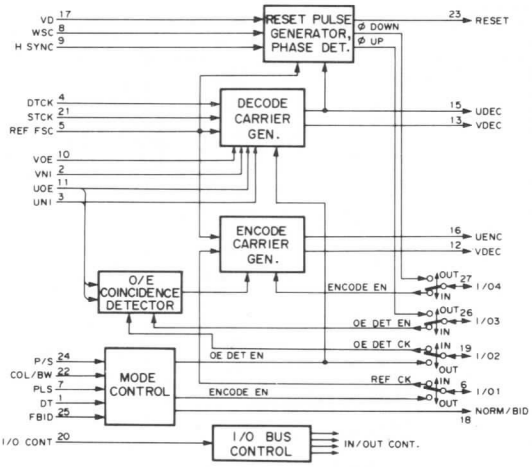
BPRS; BURST PRESENCE INDICATION PULSE INPUT
CINF; COLOR INFORMATION SIGNAL INPUT
DT; DT MODE INDICATION SIGNAL INPUT
DT V; VD SIGNAL INPUT IN THE DT MODE
FLY; FLYWHEEL EFFICIENCY CONTROL SIGNAL INPUT
M1,M2; COLOR SYSTEM SELECTION SIGNAL INPUTS
NI; CHROMA LINE PHASE INDICATION SIGNAL INPUT
N : NORMAL, I : INVERSION
NIRI; NI RESET SIGNAL INPUT
NIRO; NI RESET SIGNAL OUTPUT
OE; ODD/EVEN LINE INDICATION SIGNAL OUTPUT
PB V; OFFTAPE VD INPUT
PLST; VTR PLAY STATUS SIGNAL INPUT
REF V; REFERENCE VD SIGNAL INPUT
SR; SYSTEM RESET SIGNAL INPUT
TAPE/EE; VTR TAPE/EE MODE SIGNAL INPUT
TEST1 TO 4; CHECK SIGNAL OUTPUTS IN THE TEST MODE
WCFP; WRITE SIDE COLOR FRAMING PULSE INPUT
WCNT H; COUNTER H SIGNAL INPUT IT IS A H TIMING SIGNAL GENERATED BY A WCK AFC COUNTER OUT.
WFLD; WRITE SIDE FIELD SIGNAL OUTPUT
WID; SECAM ID SIGNAL INPUT
WOE; ODD/EVEN LINE INDICATION SIGNAL INPUT
WV; FIELD TOP PULSE OUTPUT

CX20196 (SONY)
BIPOLAR DECODE/ENCODE CARRIER GENERATOR
— TOP VIEW —




COL/BW; COLOR/BLACK & WHITE MODE SIGNAL INPUT
DT; DT MODE SIGNAL INPUT
DTCK; DT MODE CLOCK INPUT
FBID; FAST BIDIREX MODE SIGNAL INPUT
H SYNC; H SYNC SIGNAL INPUT
I/O1; I/O BUS 1 IN=REF CK, OUT=ENCODE EN
I/O2; I/O BUS 2 IN=OE DET CK, OUT=OE DET EN
I/O3; I/O BUS 3 IN=OE DET EN, OUT= DET OUT(UP)
I/O4; I/O BUS 4 IN=ENCODE EN, OUT= DET OUT(DOWN)
I/O CONT; I/O BUS CONTROL SIGNAL INPUT
NORM/BID; NORAL PLAY/BIDIREX PLAY MODE SIGNAL OUTPUT
PLST; VTR PLAY STATUS SIGNAL INPUT
P/S; PAL/SECAM MODE SIGNAL INPUT
RESET; START/STOP VCO RESET SIGNAL OUTPUT
REF FSC; REFERENCE SUBCARRIER FREQUENCY SIGNAL INPUT
STCK; SHUTTLE MODE CLOCK INPUT
UDEC; U AXIS DECODED CARRIER OUTPUT
UENC; U AXIS ENCODED CARRIER OUTPUT
UNI; U AXIS N/I SIGNAL INPUT
UOE; U AXIS O/E SIGNAL INPUT
VD; VERTICAL DRIVE SIGNAL INPUT
VDEC; V AXIS DECODED CARRIER OUTPUT
VENC; V AXIS ENCODED CARRIER OUTPUT
VNI; V AXIS N/I SIGNAL INPUT
VOE; V AXIS O/E SIGNAL INPUT
WSC; WRITE SIDE SUBCARRIER INPUT

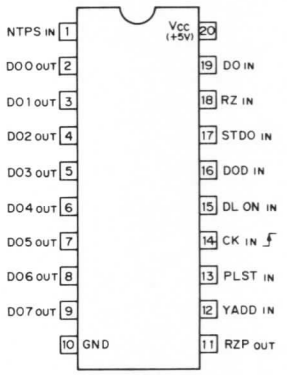


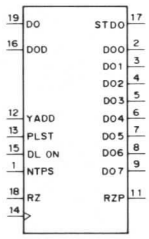



## CX20219 (SONY)

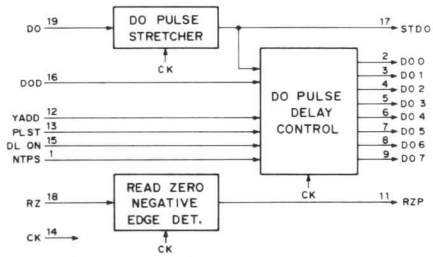
BIPOLAR DROPOUT PULSE STRETCHER

— TOP VIEW —



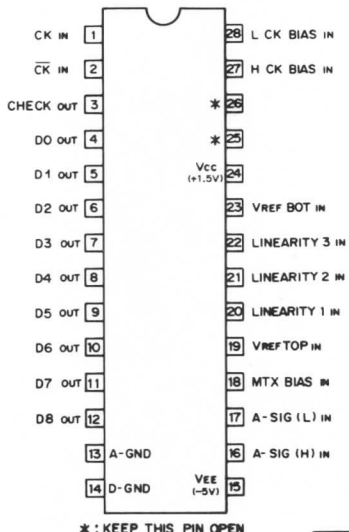

DL ON; 1H DROPOUT MEMORY ON SIGNAL INPUT
DO; DROPOUT SIGNAL INPUT
DO0-10; DELAYED STDO SIGNAL OUTPUTS
DOD; DO SIGNAL INPUT FOR DELAY PROCESS INPUT SIGNAL
YADD ON ...1H MEMORY OUT
YADD OFF ..STDO
NTPS; COLOR SYSTEM SELECTION SIGNAL INPUT
NOMALLY, CONNECT TO GND.
PLST; VTR PLAY STATUS SIGNAL INPUT
RZ; READ ZERO SIGNAL INPUT
RZP; READ ZERO PULSE OUTPUT
STDO; STRETCHED DROPOUT SIGNAL OUTPUT
YADD; Y ADDITION INSTRUCTION SIGNAL INPUT
H=YADD ON, L=YADD OFF



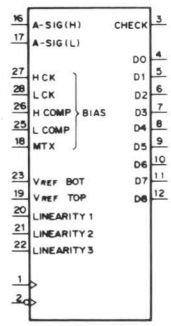

## CX20220-1DOT (SONY)

9-BIT A/D CONVERTER (ECL OUTPUTS)

— TOP VIEW —




*; KEEP THIS PIN OPEN




A-SIG(H) ; UPPER-BIT CONV. INPUT
A-SIG(L) ; LOWER-BIT CONV. INPUT
DO - D9 ; OUTPUTS DATA
CK BIAS ; CLOCK ADJ. INPUTS
COMP BIAS; COMPARATOR ADJ. INPUT
MTX BIAS ; MATRIX ADJ. INPUT
LINEARITY ; LINEARITY ADJ. INPUTS
VREF ; REFERENCE VOLTAGE
CHECK ; CHECK SIGNAL OUTPUT

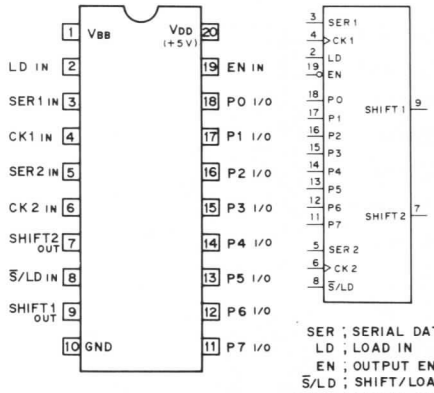
| A-SIG | D8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | DO |
|---|---|---|---|---|---|---|---|---|---|
| V TOP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | | | | | | | | | |
| | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| V BOT | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

0; LOW LEVEL
1; HIGH LEVEL

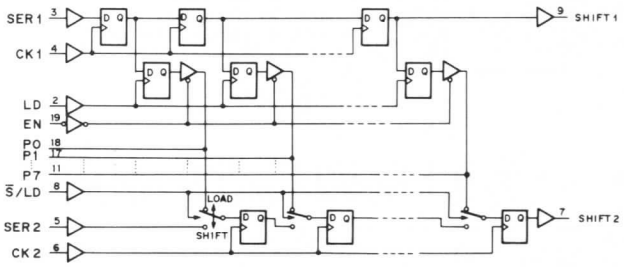
## CX23024 (SONY)

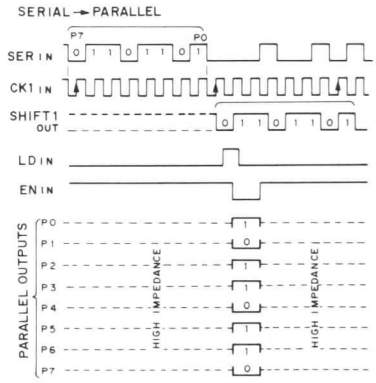
N-MOS 8-BIT SERIAL TO/FROM PARALLEL SHIFT REGISTER

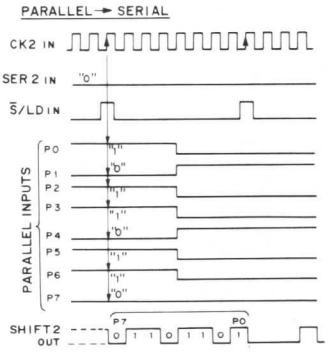
— TOP VIEW —



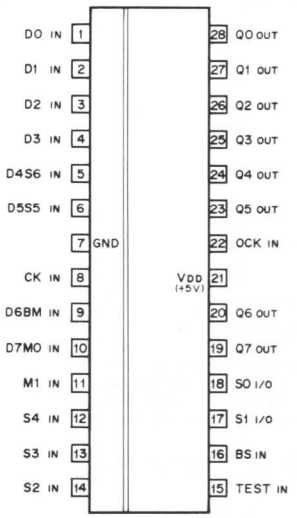

SER ; SERIAL DATA IN
LD ; LOAD IN
EN ; OUTPUT ENABLE IN
S/LD ; SHIFT/LOAD CONTROL IN
SHIFT ; SERIAL SHIFT DATA OUT
P0-P7 ; PARALLEL DATA IN/OUT

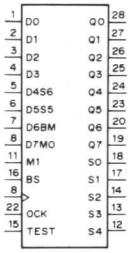


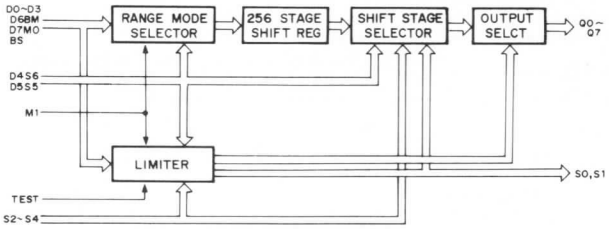



CX23038 (SONY)
C-MOS PROGRAMABLE SHIFT REGISTER
— TOP VIEW —

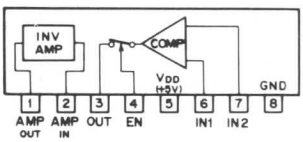



D0~D3 : DATA INPUT
D4S6,D5S5 : DATA/SHIFT SELECT INPUT
S0~S4 : SHIFT SELECT INPUT
Q0~Q7 : DATA OUTPUT
D6BM : DATA/BIT SLICE INPUT
D7M0,M1 : DATA/RANGE MODE INPUT
BS : DATA/BIT SLICE CHANGE INPUT
CK : MAIN CLOCK
OCK : OUTPUT CLOCK
TEST : LIMITER SELECT INPUT



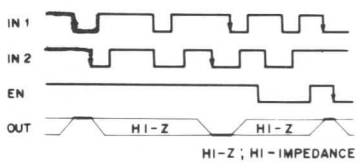

CX23065 (SONY)
N-MOS PHASE COMPARATOR WITH INVERSION AMPLIFIER
— PRINTED SIDE VIEW —




| EN | OUT |
|---|---|
| 1 | ACTIVE |
| 0 | HIGH IMPEDANCE |

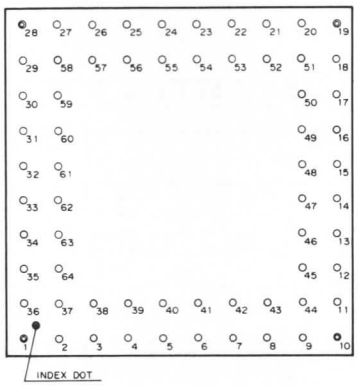
1 ; HIGH LEVEL
0; LOW LEVEL

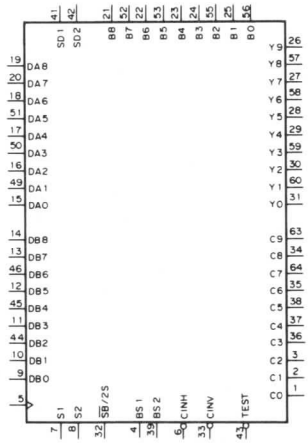
TIMMING CHART




HI-Z ; HI-IMPEDANCE

CX23082 (SONY)
C-MOS DIGITAL Y/C SEPARATION FILTER
— TOP VIEW —



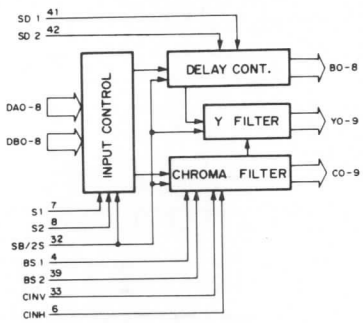




| PIN NO. | IN | OUT | SYMBOL |
|---|---|---|---|
| 1 | | 0 | C0 |
| 2 | | 0 | C1 |
| 3 | | 0 | C2 |
| 4 | 0 | | BS1 |
| 5 | 0 | | CK |
| 6 | 0 | | CINH |
| 7 | 0 | | S1 |
| 8 | 0 | | S2 |
| 9 | 0 | | DB0 |
| 10 | 0 | | DB1 |
| 11 | 0 | | DB3 |
| 12 | 0 | | DB5 |
| 13 | 0 | | DB7 |
| 14 | 0 | | DB8 |
| 15 | 0 | | DA0 |
| 16 | 0 | | DA2 |

| PIN NO. | IN | OUT | SYMBOL |
|---|---|---|---|
| 17 | 0 | | DA4 |
| 18 | 0 | | DA6 |
| 19 | 0 | | DA8 |
| 20 | 0 | | DA7 |
| 21 | | 0 | B8 |
| 22 | | 0 | B6 |
| 23 | | 0 | B4 |
| 24 | | 0 | B3 |
| 25 | | 0 | B1 |
| 26 | | 0 | Y9 |
| 27 | | 0 | Y7 |
| 28 | | 0 | Y5 |
| 29 | | 0 | Y4 |
| 30 | | 0 | Y2 |
| 31 | | 0 | Y0 |
| 32 | 0 | | SB/2S |

| PIN NO. | IN | OUT | SYMBOL |
|---|---|---|---|
| 33 | 0 | | CINV |
| 34 | | 0 | C8 |
| 35 | | 0 | C6 |
| 36 | | 0 | C3 |
| 37 | | 0 | C4 |
| 38 | | 0 | C5 |
| 39 | 0 | | BS2 |
| 40 | 0 | | GND |
| 41 | 0 | | SD1 |
| 42 | 0 | | SD2 |
| 43 | 0 | | TEST |
| 44 | 0 | | DB2 |
| 45 | 0 | | DB4 |
| 46 | 0 | | DB6 |
| 47 | 0 | | VDD (+5V) |
| 48 | 0 | | GND |

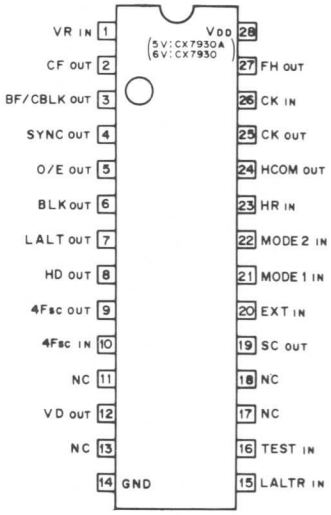
| PIN NO. | IN | OUT | SYMBOL |
|---|---|---|---|
| 49 | 0 | | DA1 |
| 50 | 0 | | DA3 |
| 51 | 0 | | DA5 |
| 52 | | 0 | B7 |
| 53 | | 0 | B5 |
| 54 | 0 | | GND |
| 55 | | 0 | B2 |
| 56 | | 0 | B0 |
| 57 | | 0 | Y8 |
| 58 | | 0 | Y6 |
| 59 | | 0 | Y3 |
| 60 | | 0 | Y1 |
| 61 | 0 | | VDD(+5V) |
| 62 | 0 | | GND |
| 63 | | 0 | C9 |
| 64 | | 0 | C7 |

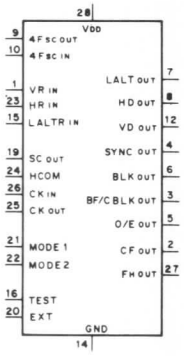



**FUNCTIONAL PIN DEFINITION**

| SYMBOL | PIN NO. | DESCRIPTION |
|---|---|---|
| B0 | 56 | BYPASS DATA OUTPUTS |
| B1 | 25 | |
| B2 | 55 | |
| B3 | 24 | |
| B4 | 23 | |
| B5 | 53 | |
| B6 | 22 | |
| B7 | 52 | |
| B8 | 21 | |
| BS1 | 4 | ROUND OFF BIT SELECTION SIGNAL 1 INPUT |
| BS2 | 39 | ROUND OFF BIT SELECTION SIGNAL 2 INPUT |
| C0 | 1 | CHROMA DATA OUTPUTS |
| C1 | 2 | |
| C2 | 3 | |
| C3 | 36 | |
| C4 | 37 | |
| C5 | 38 | |
| C6 | 35 | |
| C7 | 64 | |
| C8 | 34 | |
| C9 | 63 | |
| CK | 5 | |
| CINH | 6 | CHROMA DATA INHIBIT SIGNAL INPUT |
| CINV | 33 | CHROMA DATA INVERSION SIGNAL INPUT |
| DA0 | 15 | DATA A INPUTS |
| DA1 | 49 | |
| DA2 | 16 | |
| DA3 | 50 | |
| DA4 | 17 | |
| DA5 | 51 | |
| DA6 | 18 | |
| DA7 | 20 | |
| DA8 | 19 | |
| DB0 | 9 | DATA B INPUTS |
| DB1 | 10 | |
| DB2 | 44 | |
| DB3 | 11 | |
| DB4 | 45 | |
| DB5 | 12 | |
| DB6 | 46 | |
| DB7 | 13 | |
| DB8 | 14 | |
| S1 | 7 | DATA A/B SELECTION SIGNAL 1 INPUT |
| S2 | 8 | DATA A/B SELECTION SIGNAL 2 INPUT |
| SB/2S | 32 | STRAIGHT BINARY/2'S COMPLEMENT CODE SELECTION SIGNAL INPUT |
| SD1 | 41 | DELAY CONTROL SIGNAL 1 INPUT |
| SD2 | 42 | DELAY CONTROL SIGNAL 2 INPUT |
| TEST | 43 | TEST MODE SIGNAL INPUT |
| Y0 | 31 | Y SIGNAL OUTPUTS |
| Y1 | 60 | |
| Y2 | 30 | |
| Y3 | 59 | |
| Y4 | 29 | |
| Y5 | 28 | |
| Y6 | 58 | |
| Y7 | 27 | |
| Y8 | 57 | |
| Y9 | 26 | |

CX7930A (SONY) FLAT PACKAGE
C-MOS SYNC GENERATOR (NTSC, PAL-M, PAL, SECAM)
— TOP VIEW —




O/E : ODD/EVEN FIELD
CF : COLOR FRAME PULSE
HCOM : H COMPARATOR

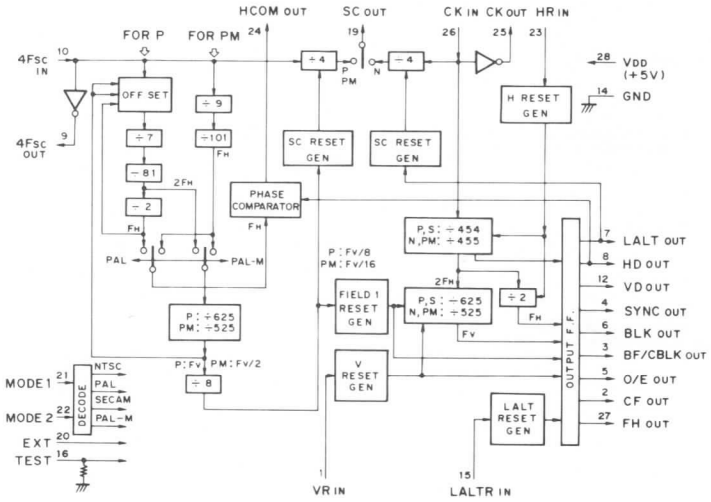
| SYSTEM | 4Fsc | CLOCK |
|---|---|---|
| NTSC | 910 FH | 910FH |
| PAL | 1135FH+2Fv | 908FH |
| PALM | 909FH | 910FH |
| SECAM | —— | 908FH |

| INPUTS | | SYSTEM |
|---|---|---|
| MODE 1 | MODE 2 | |
| 0 | 0 | NTSC |
| 0 | 1 | SECAM |
| 1 | 0 | PALM |
| 1 | 1 | PAL |

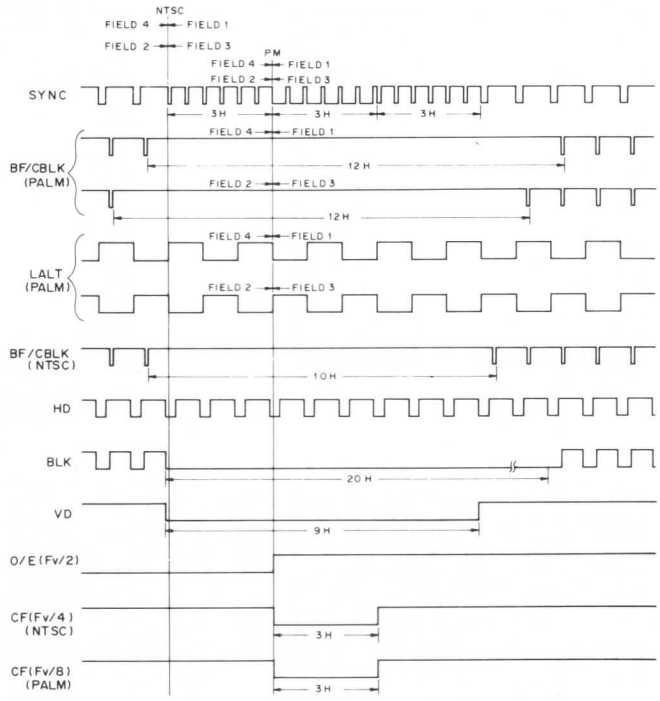
0 ; LOW LEVEL (GND)
1 ; HIGH LEVEL (VDD)

| INPUTS | | FUNCTION |
|---|---|---|
| EXT | TEST | |
| 0 | 0 | INTERNAL |
| 0 | 1 | INVALID |
| 1 | 0 | EXT |
| 1 | 1 | TEST |

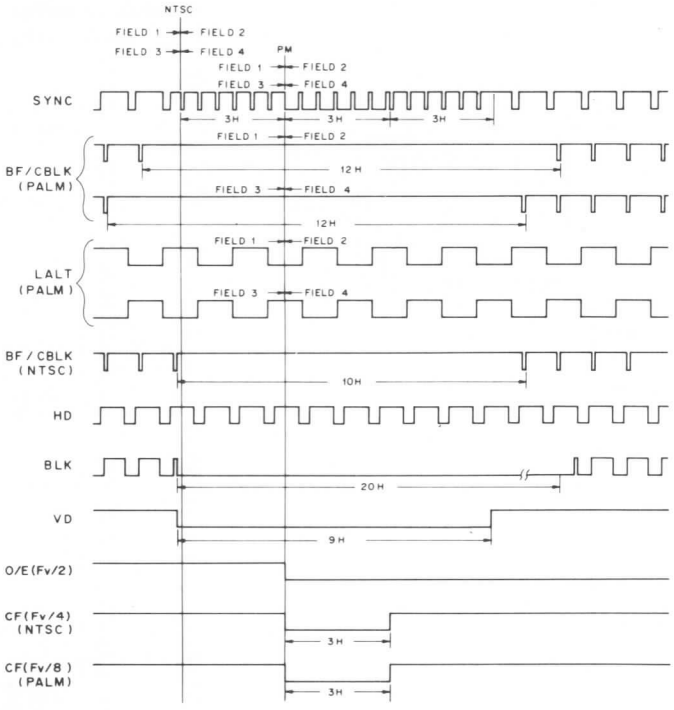
TEST "0": OPEN
(INTERNALLY
PULLED DOWN)

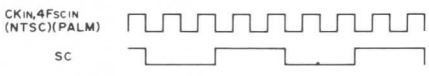



NTSC, PAL-M (FIELD 1, 3)

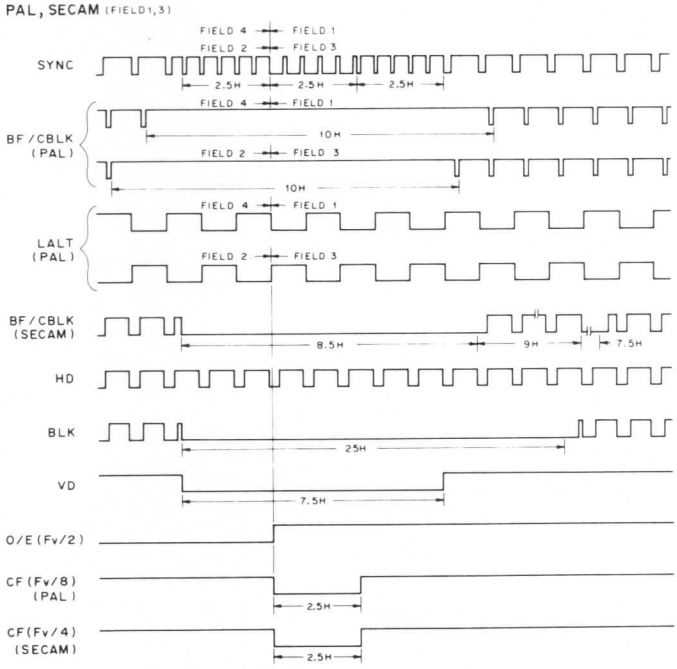


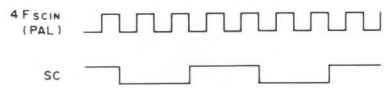

NTSC, PAL-M (FIELD 2, 4)



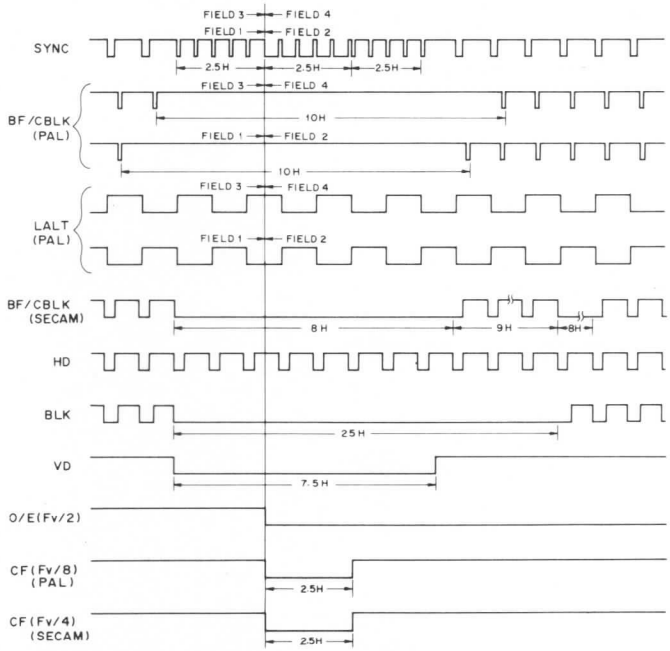



PAL, SECAM (FIELD 1, 3)

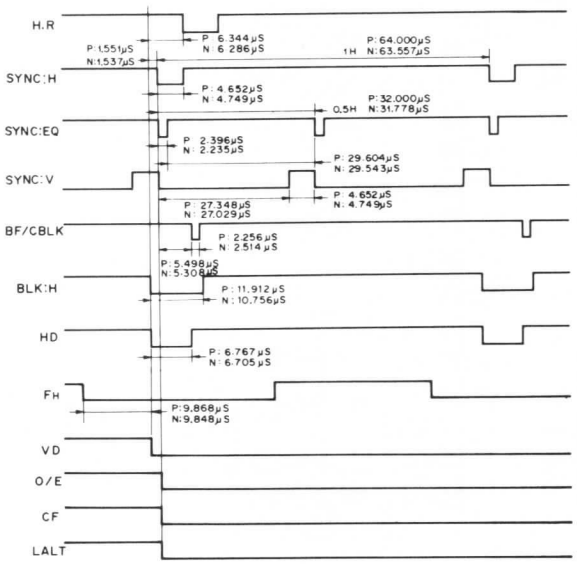


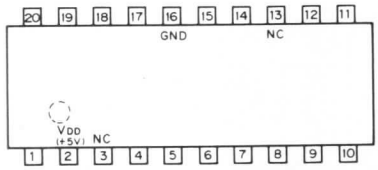

PAL, SECAM (FIELD 4, 2)




P: PAL, SECAM
N: NTSC, PALM

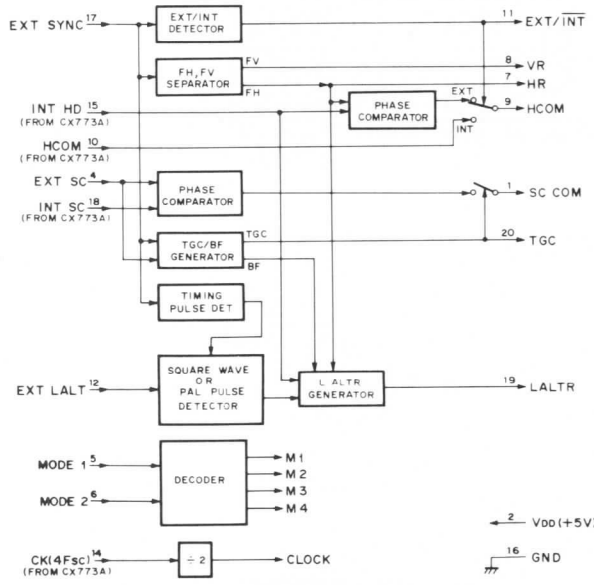



CX7998 (SONY) FLAT PACKAGE
C-MOS GENLOCK DRIVER FOR CX773A
— TOP VIEW —

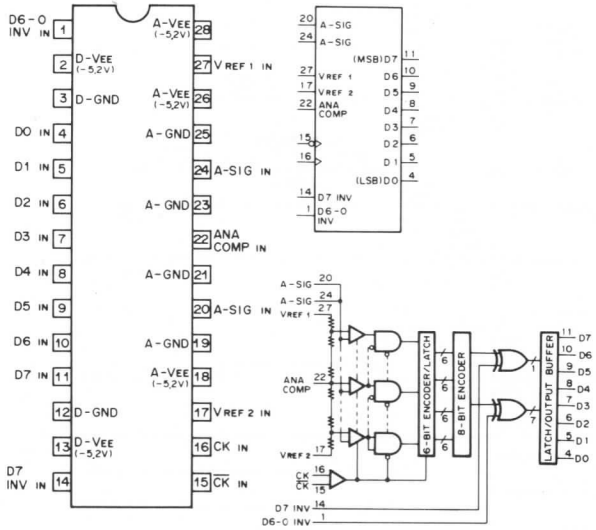



| INPUTS | | EXT LOCK MODE | |
|---|---|---|---|
| MODE 1 | MODE 2 | | |
| 0 | 0 | M1 | PAL:VBS |
| 1 | 0 | M2 | PAL-M:VBS |
| 0 | 1 | M3 | PAL:VS/SC/LALT |
| | | | SECAM:VS/SC/LALT |
| 1 | 1 | M4 | NTSC:VBS |
| | | | NTSC:VS/SC |
| | | | PAL-M:VS/SC/LALT |

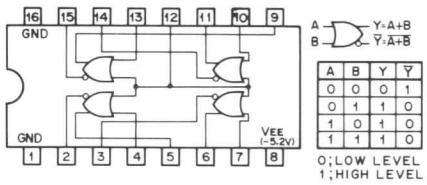
0; LOW LEVEL
1; HIGH LEVEL



CXA1016D (SONY)
8-BIT FLASH TYPE A/D CONVERTER
— SIDE VIEW —



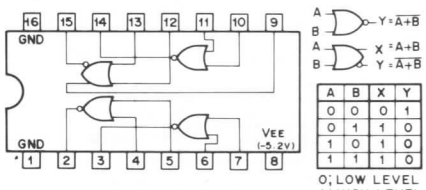

HD10101 (HITACHI)
MC10101L (MOTOROLA)
ECL 2-INPUT OR/NOR GATE
— TOP VIEW —




| A | B | Y | $\overline{Y}$ |
|---|---|---|---|
| 0 | 0 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 1 | 0 |

0; LOW LEVEL
1; HIGH LEVEL

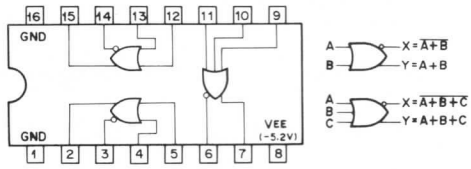
HD10102 (HITACHI)
MC10102L (MOTOROLA)
ECL 2-INPUT NOR GATE
— TOP VIEW —



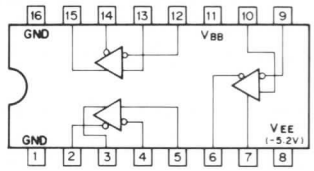

| A | B | X | Y |
|---|---|---|---|
| 0 | 0 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 1 | 0 |

0; LOW LEVEL
1; HIGH LEVEL

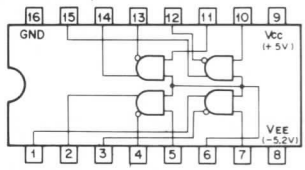
HD10105 (HITACHI)
MC10105L (MOTOROLA)
ECL 2-3-2-INPUT OR/NOR GATE
— TOP VIEW —



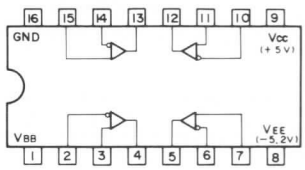

HD10116 (HITACHI)
MC10116L (MOTOROLA)
ECL 4-3-3-INPUT NOR GATE
— TOP VIEW —



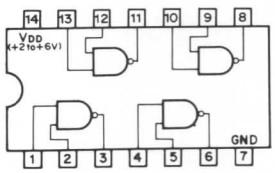

HD10124 (HITACHI)
MC10124L (MOTOROLA)
ECL TTL-TO-ECL TRANSLATOR
— TOP VIEW —

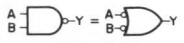



HD10125 (HITACHI)
MC10125L (MOTOROLA)
ECL ECL-TO-TTL TRANSLATOR
— TOP VIEW —



HD74HC00P (HITACHI)
MC74HC00N (MOTOROLA)
TC74HC00F (TOSHIBA) FLAT PACKAGE
TC74HC00P (TOSHIBA)
C-MOS 2-INPUT NAND GATE
— TOP VIEW —

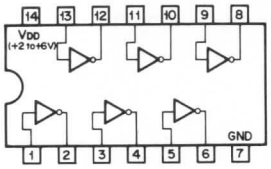



| A | B | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

0; LOW LEVEL
1; HIGH LEVEL

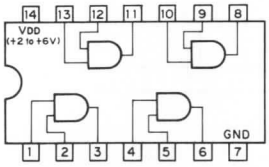
HD74HC04P (HITACHI)
MC74HC04N (MOTOROLA)
TC74HC04F (TOSHIBA) FLAT PACKAGE
TC74HC04P (TOSHIBA)
C-MOS INVERTER
— TOP VIEW —



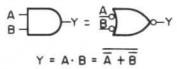
| A | Y |
|---|---|
| 0 | 1 |
| 1 | 0 |

0: LOW LEVEL
1: HIGH LEVEL

HD74HC08P (HITACHI)
MC74HC08N (MOTOROLA)
TC74HC08F (TOSHIBA) FLAT PACKAGE
TC74HC08P (TOSHIBA)
C-MOS 2-INPUT AND GATE
— TOP VIEW —



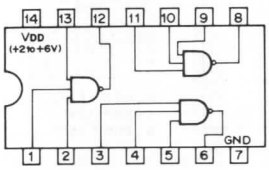

TC74HC08P

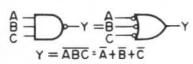



| A | B | Y |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

0; LOW LEVEL
1; HIGH LEVEL

HD74HC10P (HITACHI)
MC74HC10N (MOTOROLA)
TC74HC10F (TOSHIBA) FLAT PACKAGE
TC74HC10P (TOSHIBA)
C-MOS 3-INPUT NAND GATE
— TOP VIEW —

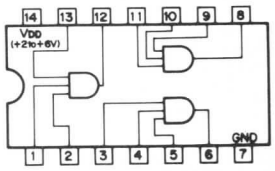


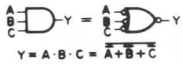




| A | B | C | Y |
|---|---|---|---|
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 0 |

0 : LOW LEVEL
1 : HIGH LEVEL

HD74HC11P (HITACHI)
MC74HC11N (MOTOROLA)
TC74HC11P (TOSHIBA)
C-MOS 3-INPUT AND GATE

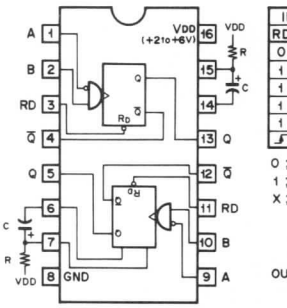



| A | B | C | Y |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 |

0;LOW LEVEL
1;HIGH LEVEL

HD74HC123P (HITACHI)
TC74HC123P (TOSHIBA)
C-MOS RETRIGGERABLE MONOSTABLE MULTIVIBRATOR
— TOP VIEW —

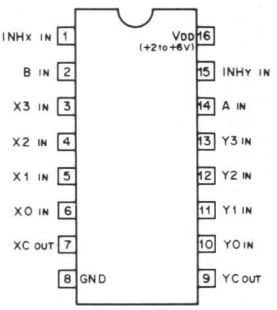


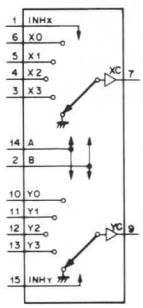

| INPUTS | | | OUTPUTS | |
|---|---|---|---|---|
| RD | A | B | Q | Q̄ |
| 0 | X | X | 0 | 1 |
| 1 | 1 | X | 0 | 1 |
| 1 | X | 0 | 0 | 1 |
| 1 | 0 | ↓ | ↓ | ↓ |
| 1 | ↓ | 1 | ↓ | ↓ |
| ↓ | 0 | 1 | ↓ | ↓ |

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

OUTPUT PULSE WIDTH = 0.46CR

HD74HC153P (HITACHI)
MC74HC153N (MOTOROLA)
TC74HC153F (TOSHIBA) FLAT PACKAGE
TC74HC153P (TOSHIBA)
C-MOS 4-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER
— TOP VIEW —

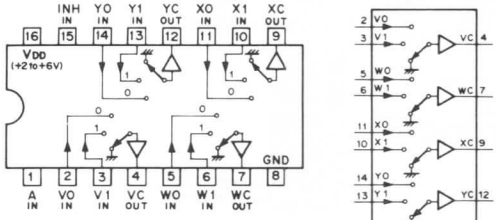



| CONTROL IN | | | ON CHANNEL |
|---|---|---|---|
| INH | B | A | |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 2 |
| 0 | 1 | 1 | 3 |
| 1 | X | X | GND |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

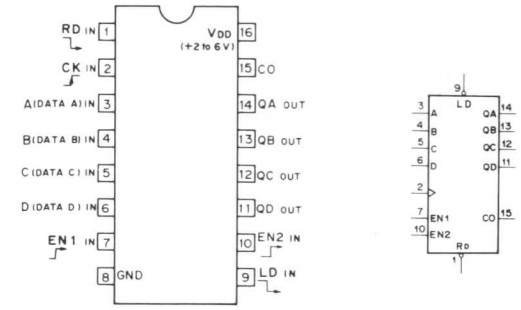
HD74HC157P (HITACHI)
MC74HC157N (MOTOROLA)
TC74HC157P (TOSHIBA)
C-MOS 2-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER
— TOP VIEW —




| CONT. IN | | ON CHANNEL |
|---|---|---|
| INH | A | |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | X | GND |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

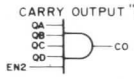
HD74HC163P (HITACHI)
MC74HC163N (MOTOROLA)
TC74HC163P (TOSHIBA)
C-MOS PRESETTABLE SYNCHRONOUS 4-BIT BINARY COUNTER
— TOP VIEW —




MODE SELECTION

| CONTROL INPUTS | | | | MODE |
|---|---|---|---|---|
| RD | LD | EN1 | EN2 | |
| 0 | X | X | X | RESET (SYNCHRONOUS) |
| 1 | 0 | X | X | PRESET (SYNCHRONOUS) |
| 1 | 1 | 0 | X | NO COUNT |
| 1 | 1 | X | 0 | NO COUNT |
| 1 | 1 | 1 | 1 | COUNT |

CARRY OUTPUT "CO"

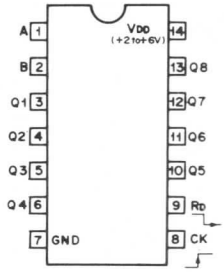


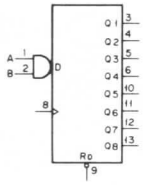

CO IS HIGH WHEN EN2 INPUT IS HIGH AND COUNT IS "15".

COUNT SEQUENCE

| COUNT | OUTPUTS | | | |
|---|---|---|---|---|
| | QD | QC | QB | QA |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 2 | 0 | 0 | 1 | 0 |
| 3 | 0 | 0 | 1 | 1 |
| 4 | 0 | 1 | 0 | 0 |
| 5 | 0 | 1 | 0 | 1 |
| 6 | 0 | 1 | 1 | 0 |
| 7 | 0 | 1 | 1 | 1 |
| 8 | 1 | 0 | 0 | 0 |
| 9 | 1 | 0 | 0 | 1 |
| 10 | 1 | 0 | 1 | 0 |
| 11 | 1 | 0 | 1 | 1 |
| 12 | 1 | 1 | 0 | 0 |
| 13 | 1 | 1 | 0 | 1 |
| 14 | 1 | 1 | 1 | 0 |
| 15 | 1 | 1 | 1 | 1 |

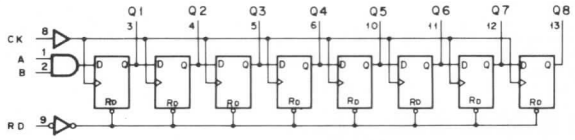
HD74HC164P (HITACHI)
MC74HC164N (MOTOROLA)
TC74HC164P (TOSHIBA)
C-MOS 8-BIT SERIAL-IN/PARALLEL-OUT SHIFT REGISTER
— TOP VIEW —



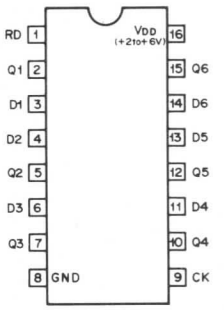



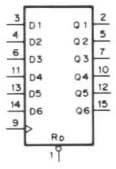

| INPUTS | | | | OUTPUTS | | | |
|---|---|---|---|---|---|---|---|
| RD | CK | A | B | Q1 | Q2 | ---- | Q8 |
| 0 | X | X | X | 0 | 0 | 0 | 0 |
| 1 | 0 | X | X | Q1o | Q2o | ---- | Q8o |
| 1 | ↑ | 1 | 1 | 1 | Q1n | ---- | Q7n |
| 1 | ↑ | 0 | X | 0 | Q1n | ---- | Q7n |
| 1 | ↑ | X | 0 | 0 | Q1n | ---- | Q7n |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE




HD74HC174P (HITACHI)
MC74HC174N (MOTOROLA)
TC74HC174P (TOSHIBA)
C-MOS D-TYPE FLIP-FLOP WITH RESET
— TOP VIEW —

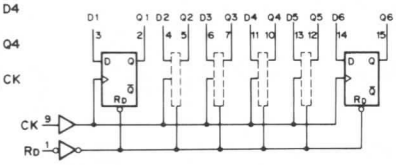


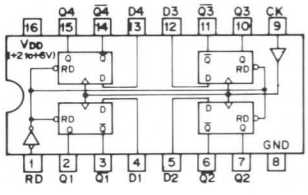

EACH FLIP-FLOP

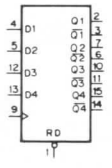
| INPUTS | | | OUT |
|---|---|---|---|
| RD | CK | D | Q |
| 0 | X | X | 0 |
| 1 | ↑ | 0 | 0 |
| 1 | ↑ | 1 | 1 |
| 1 | 0 | X | Qo |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE




HD74HC175P (HITACHI)
MC74HC175N (MOTOROLA)
TC74HC175F (TOSHIBA) FLAT PACKAGE
TC74HC175P (TOSHIBA)
C-MOS D-TYPE FLIP-FLOP WITH RESET
— TOP VIEW —

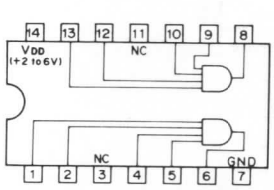


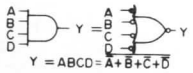




| RD | CK | D | Q | Q̄ |
|---|---|---|---|---|
| 0 | X | X | 0 | 1 |
| 1 | ↑ | 1 | 1 | 0 |
| 1 | ↑ | 0 | 0 | 1 |
| 1 | 0 | X | Qo | Q̄o |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

HD74HC21P (HITACHI)
MC74HC21N (MOTOROLA)
TC74HC21P (TOSHIBA)
C-MOS 4-INPUT POSITIVE AND GATE
— TOP VIEW —

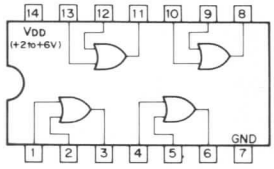


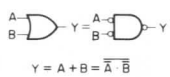




| A | B | C | D | Y |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 | 0 |
| : | : | : | : | : |
| 1 | 1 | 0 | 1 | 0 |
| 1 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 |

0 ; LOW LEVEL
1 ; HIGH LEVEL

HD74HC32P (HITACHI)
MC74HC32N (MOTOROLA)
TC74HC32P (TOSHIBA)
C-MOS 2-INPUT OR GATE
— TOP VIEW —

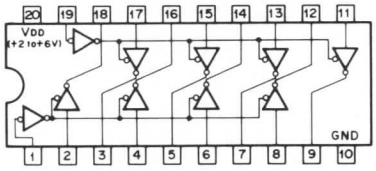



| A | B | Y |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

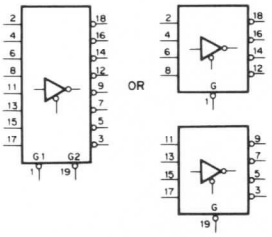
0 ; LOW LEVEL
1 ; HIGH LEVEL

HD74HC240P (HITACHI)
HD74HCT240P (HITACHI)
MC74HC240N (MOTOROLA)
MC74HCT240N (MOTOROLA)
SN74HC240N (TI)
TC74HC240P (TOSHIBA)
TC74HCT240P (TOSHIBA)
C-MOS 3-STATE INVERTER/LINE DRIVER
— TOP VIEW —

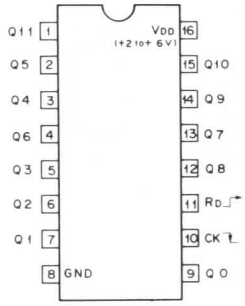


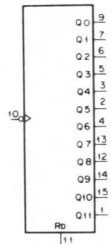
| G | A | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | X | HI-Z |

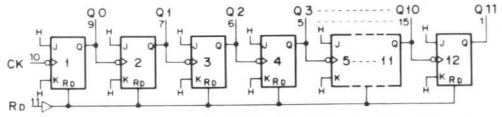
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE




HD74HC4040P (HITACHI)
MC74HC4040N (MOTOROLA)
TC74HC4040P (TOSHIBA)
C-MOS 12-STAGE RIPPLE CARRY BINARY COUNTER/DRIVER
— TOP VIEW —



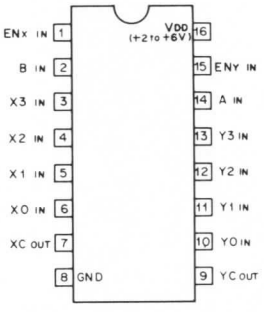



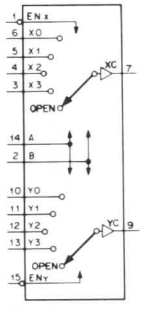

| COUNT | Q11 | Q10 | Q9 | Q8 | Q7 | Q6 | Q5 | Q4 | Q3 | Q2 | Q1 | Q0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| : | : | : | : | : | : | : | : | : | : | : | : | : |
| 4095 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

| RD | Q11 ····· Q0 |
|---|---|
| 1 | ALL LOW |
| 0 | COUNT |

0 ; LOW LEVEL
1 ; HIGH LEVEL

HD74HC253P (HITACHI)
MC74HC253N (MOTOROLA)
TC74HC253P (TOSHIBA)
C-MOS 4-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER
— TOP VIEW —

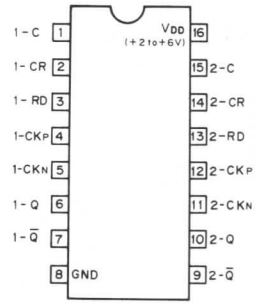


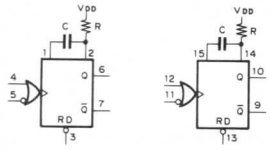




| CONTROL IN | | | ON CHANNEL |
|---|---|---|---|
| EN | B | A | |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 2 |
| 0 | 1 | 1 | 3 |
| 1 | X | X | OPEN |

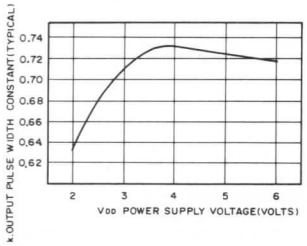
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

HD74HC4538P (HITACHI)
MC74HC4538N (MOTOROLA)
TC74HC4538P (TOSHIBA)
C-MOS DUAL RETRIGGERABLE/NON-RETRIGGERABLE MONOSTABLE MULTIVIBRATOR
— TOP VIEW —

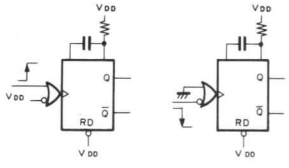


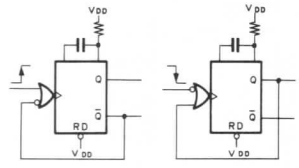

OUTPUT PULSE WIDTH = k·C·R



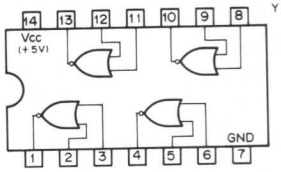

RETRIGGERABLE M.M.V

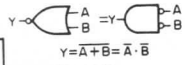



NON-RETRIGGERABLE M.M.V




HD74LS02P (HITACHI)
SN74LS02N (TI)
TTL 2-INPUT POSITIVE-NOR GATE
— TOP VIEW —



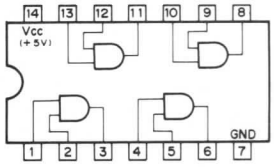



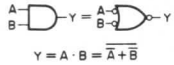

$Y = \overline{A+B} = \overline{A} \cdot \overline{B}$

| A | B | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 0 |

0; LOW LEVEL
1; HIGH LEVEL

HD74LS08P (HITACHI)
SN74LS08N (TI)
TTL 2-INPUT POSITIVE-AND GATE
— TOP VIEW —



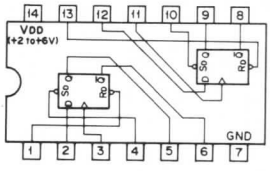




$Y = A \cdot B = \overline{\overline{A}+\overline{B}}$

| A | B | Y |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

0; LOW LEVEL
1; HIGH LEVEL

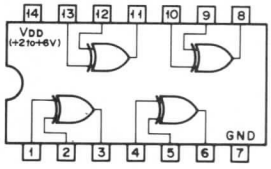
HD74HC74P (HITACHI)
MC74HC74N (MOTOROLA)
TC74HC74F (TOSHIBA) FLAT PACKAGE
TC74HC74P (TOSHIBA)
C-MOS D-TYPE FLIP FLOP WITH DIRECT SET/RESET
— TOP VIEW —




| INPUTS | | | | OUTPUTS | |
|---|---|---|---|---|---|
| Sd | Rd | CK | D | Qn+1 | Q̄n+1 |
| 0 | 1 | X | X | 1 | 0 |
| 1 | 0 | X | X | 0 | 1 |
| 0 | 0 | X | X | 1* | 1* |
| 1 | 1 | ↑ | 1 | 1 | 0 |
| 1 | 1 | ↑ | 0 | 0 | 1 |
| 1 | 1 | 0 | X | Qn | Q̄n |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
1*; NONSTABLE

HD74HC86P (HITACHI)
MC74HC86N (MOTOROLA)
TC74HC86F (TOSHIBA) FLAT PACKAGE
TC74HC86P (TOSHIBA)
C-MOS EXCLUSIVE OR GATE
— TOP VIEW —

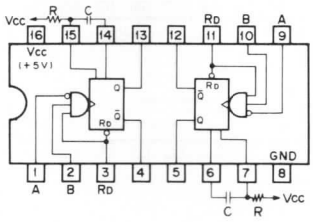


$Y = \overline{A} \cdot B + A \cdot \overline{B}$

| A | B | Y |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

0; LOW LEVEL
1; HIGH LEVEL

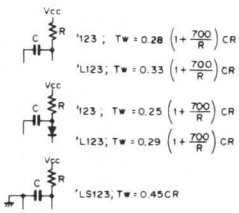
HD74LS123P (HITACHI)
SN74LS123N (TI)
TTL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR WITH DIRECT RESET
— TOP VIEW —



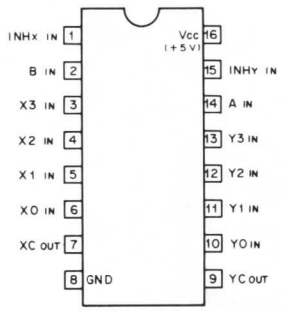

| INPUTS | | | OUTPUTS | |
|---|---|---|---|---|
| RD | A | B | Q | $\overline{Q}$ |
| 0 | X | X | 0 | 1 |
| X | 1 | X | 0 | 1 |
| X | X | 0 | 0 | 1 |
| 1 | 0 | ↑ | ⎍ | ⎍ |
| 1 | ↓ | 1 | ⎍ | ⎍ |
| ↑ | 0 | 1 | ⎍ | ⎍ |

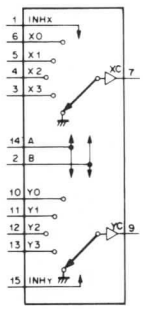
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

OUTPUT PULSE WIDTH




HD74LS153P (HITACHI)
SN74LS153N (TI)
TTL 4-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER
— TOP VIEW —

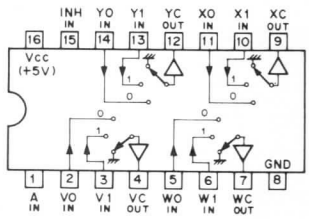


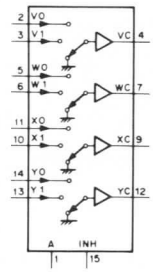




| CONTROL IN | | | ON CHANNEL |
|---|---|---|---|
| INH | B | A | |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 2 |
| 0 | 1 | 1 | 3 |
| 1 | X | X | GND |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

HD74LS157P (HITACHI)
SN74LS157N (TI)
TTL 2-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER
— TOP VIEW —

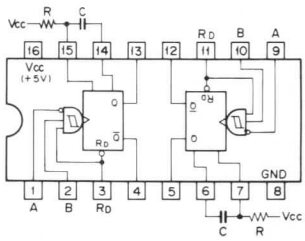



| CONT. IN | | ON CHANNEL |
|---|---|---|
| INH | A | |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | X | GND |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

HD74LS221P (HITACHI)
SN74LS221N (TI)
TTL MONOSTABLE MULTIVIBRATOR WITH SCHMITT TRIGGER INPUT
— TOP VIEW —

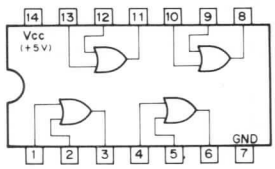


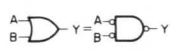

| INPUTS | | | OUTPUTS | |
|---|---|---|---|---|
| RD | A | B | Q | $\overline{Q}$ |
| 0 | X | X | 0 | 1 |
| X | 1 | X | 0 | 1 |
| X | X | 0 | 0 | 1 |
| 1 | 0 | ↑ | ⎍ | ⎍ |
| 1 | ↓ | 1 | ⎍ | ⎍ |
| ↑ | 0 | 1 | ⎍ | ⎍ |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

OUTPUT PULSE WIDTH = 0.7CR

HD74LS32P (HITACHI)
SN74LS32N (TI)
TTL 2-INPUT POSITIVE-OR GATE
— TOP VIEW —



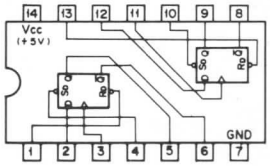




$Y = A + B = \overline{\overline{A} \cdot \overline{B}}$

| A | B | Y |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

0; LOW LEVEL
1; HIGH LEVEL

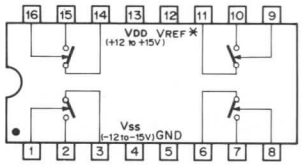
HD74LS74AP (HITACHI)
MC74F74N (MOTOROLA)
SN74LS74AN (TI)
TTL D-TYPE FLIP FLOP WITH DIRECT SET/RESET
— TOP VIEW —




| INPUTS | | | | OUTPUTS | |
|---|---|---|---|---|---|
| So | Ro | CK | D | Qn+1 | $\overline{Qn+1}$ |
| 0 | 1 | X | X | 1 | 0 |
| 1 | 0 | X | X | 0 | 1 |
| 0 | 0 | X | X | 1* | 1* |
| 1 | 1 | ↓ | 1 | 1 | 0 |
| 1 | 1 | ↓ | 0 | 0 | 1 |
| 1 | 1 | 0 | X | Qn | $\overline{Qn}$ |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
1*; NONSTABLE

HI1-0201-5 (HARRIS)
HI1-201 (HARRIS)
C-MOS ANALOG SWITCH
— TOP VIEW —



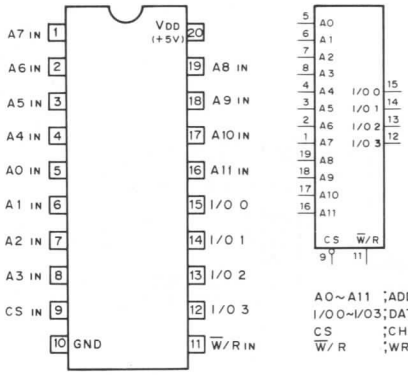

| CONT IN | SW |
|---|---|
| 0 | |
| 1 | |

0 ; LOW LEVEL
1 ; HIGH LEVEL

*NOTE

| INTERFACIAL DEVICE | | VREF CONNECTION |
|---|---|---|
| TTL | | Open |
| C-MOS | VDD ≦ 5.5V | Open |
| | VDD > 5.5V | To VDD of interfacial IC |

HM6168HP-45 (HITACHI) (ACCESS TIME = 45 nS)
HM6168HP-55 (HITACHI) (ACCESS TIME = 55 nS)
HM6168HP-70 (HITACHI) (ACCESS TIME = 70 nS)
N-MOS 16384-BIT(4096x4) STATIC RAM
— TOP VIEW —



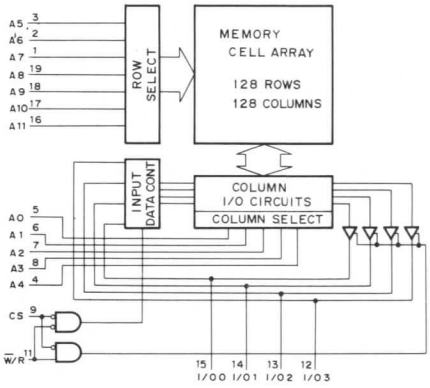




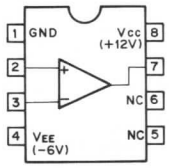
| INPUTS | | MODE |
|---|---|---|
| CS | W/R | |
| 0 | 0 | WRITE |
| 0 | 1 | READ |
| 1 | X | DISABLE (OUTPUT; HI-Z) |

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE

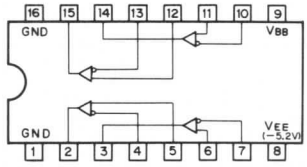
A0~A11 ;ADDRESS INPUTS
I/O0~I/O3;DATA INPUTS/OUTPUTS
CS ;CHIP SELECT INPUT
W/R ;WRITE/READ ENABLE INPUT



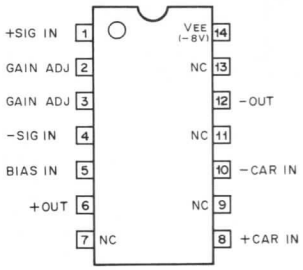

MB4002 (FUJITSU)
HIGH SPEED VOLTAGE COMPARATOR
— TOP VIEW —

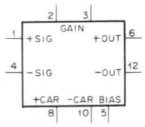



MC10115L (MOTOROLA)
ECL LINE RECEIVER
— TOP VIEW —

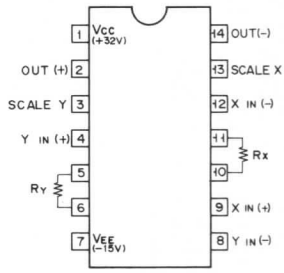


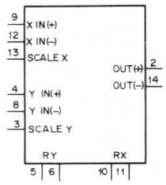

MC1496M (MOTOROLA) FLAT PACKAGE
MC1496P (MOTOROLA)
NJM1496M (JRC) FLAT PACKAGE
uA796PC (FSC)
BALANCED MODULATOR/DEMODULATOR
— TOP VIEW —



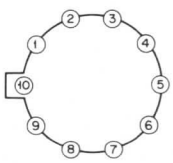




MC1595L (MOTOROLA)
LINEAR MULTIPLIER
— TOP VIEW —

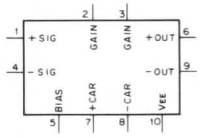


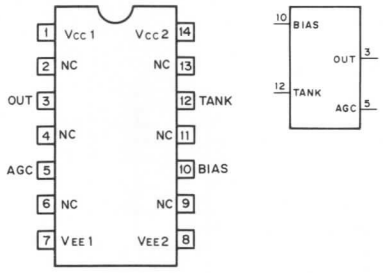

MC1596G (MOTOROLA)
DOUBLE-BALANCED MOD/DEMOD.
— BOTTOM VIEW —



1 +SIGNAL INPUT
2 GAIN ADJUST
3 GAIN ADJUST
4 -SIGNAL INPUT
5 BIAS
6 +OUTPUT
7 +CARRIER INPUT
8 -CARRIER INPUT
9 -OUTPUT
10 VEE

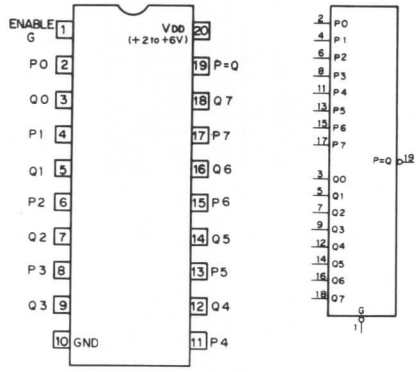


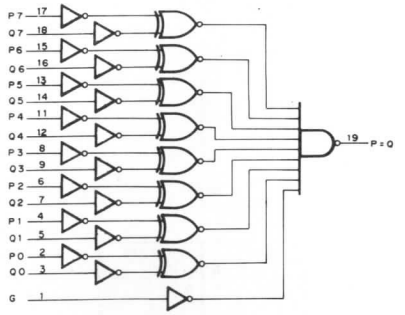
MC1648P (MOTOROLA)
ECL VOLTAGE CONTROLLED OSCILLATOR
— TOP VIEW —




| Supply Voltage | Supply Pins | GND Pins |
|---|---|---|
| +5.0 Vdc | 1, 14 | 7, 8 |
| −5.2 Vdc | 7, 8 | 1, 14 |

MC74HC688N (MOTOROLA)
TC74HC688P (TOSHIBA)
C-MOS 8-BIT MAGNITUDE COMPARATOR

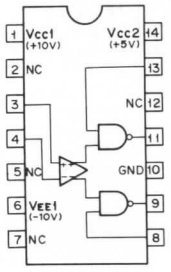


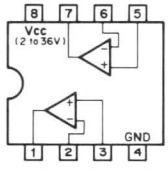

| INPUTS P, Q | G | OUTPUT P = Q |
|---|---|---|
| P=Q | 0 | 0 |
| P>Q | 0 | 1 |
| P<Q | 0 | 1 |
| X | 1 | 1 |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

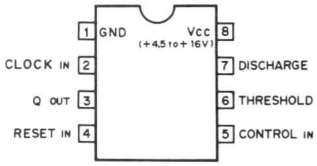
NE527N (SIGNETICS)
VOLTAGE COMPARATOR
— TOP VIEW —

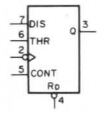



NJM2903D (JRC)
μPC393C (NEC)
VOLTAGE COMPARATOR
— TOP VIEW —

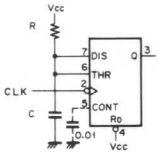



NJM555D (JRC)
PRECISION TIMER
— TOP VIEW —



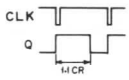




MONOSTABLE MULTIVIBRATOR

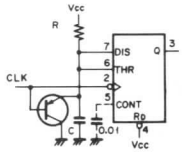



| INPUTS RD | CLK | OUT Q |
|---|---|---|
| 0 | X | 0 |
| 1 | ↓ | ⊓ |

0, LOW LEVEL
1, HIGH LEVEL
X, DON'T CARE

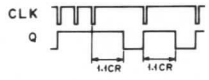



RETRIGGERABLE MONO. MULTIVIBRATOR
(MISSING PULSE DETECTOR)

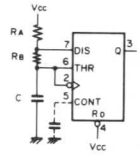



| INPUTS RD | CLK | OUT Q |
|---|---|---|
| 0 | X | 0 |
| 1 | ↓ | ⊓ |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

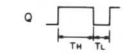



ASTABLE MULTIVIBRATOR



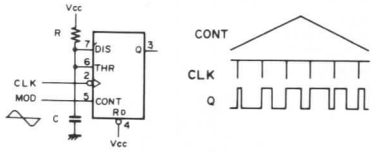

| RD | Q |
|---|---|
| 0 | 0 |
| 1 | ⊓ |

0; LOW LEVEL
1; HIGH LEVEL

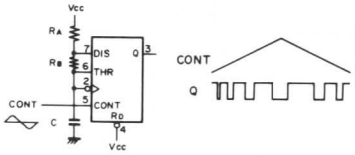



$T_H = 0.693C\,(R_A + R_B)$
$T_L = 0.693C\,R_B$

PULSE WIDTH MODULATOR



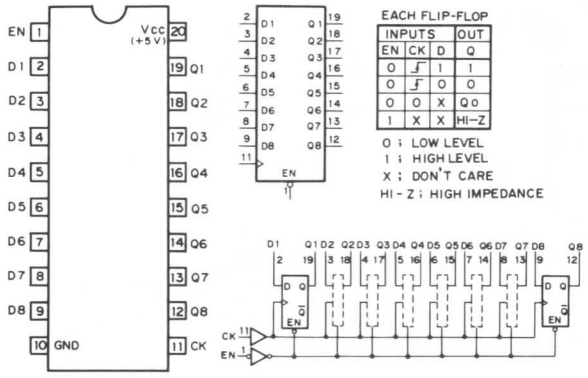

VCO
(PULSE POSITION MODULATOR)



## SN74ALS574N (TI)

TTL 3-STATE D-TYPE EDGE-TRIGGERED FLIP-FLOP

— TOP VIEW —




EACH FLIP-FLOP

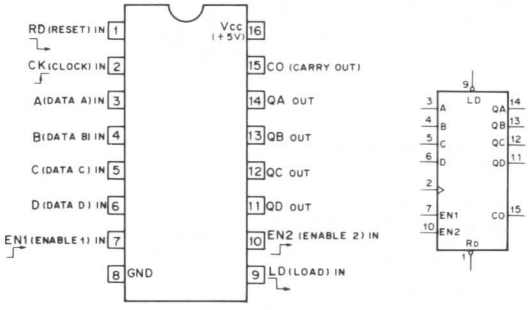
| INPUTS | | | OUT |
|---|---|---|---|
| EN | CK | D | Q |
| 0 | ↓ | 1 | 1 |
| 0 | ↓ | 0 | 0 |
| 0 | 0 | X | Q0 |
| 1 | X | X | HI-Z |

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE

## SN74LS161AN (TI)

TTL PRESETTABLE SYNCHRONOUS 4-BIT BINARY COUNTER

— TOP VIEW —




MODE SELECTION

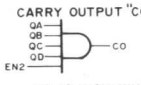
| CONTROL INPUTS | | | | MODE |
|---|---|---|---|---|
| RD | LD | EN1 | EN2 | |
| 0 | X | X | X | RESET (ASYNCHRONOUS) |
| 1 | 0 | X | X | PRESET (SYNCHRONOUS) |
| 1 | 1 | 0 | X | NO COUNT |
| 1 | 1 | X | 0 | NO COUNT |
| 1 | 1 | 1 | 1 | COUNT |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

COUNT SEQUENCE

| COUNT | OUTPUTS | | | |
|---|---|---|---|---|
| | QD | QC | QB | QA |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 2 | 0 | 0 | 1 | 0 |
| 3 | 0 | 0 | 1 | 1 |
| 4 | 0 | 1 | 0 | 0 |
| 5 | 0 | 1 | 0 | 1 |
| 6 | 0 | 1 | 1 | 0 |
| 7 | 0 | 1 | 1 | 1 |
| 8 | 1 | 0 | 0 | 0 |
| 9 | 1 | 0 | 0 | 1 |
| 10 | 1 | 0 | 1 | 0 |
| 11 | 1 | 0 | 1 | 1 |
| 12 | 1 | 1 | 0 | 0 |
| 13 | 1 | 1 | 0 | 1 |
| 14 | 1 | 1 | 1 | 0 |
| 15 | 1 | 1 | 1 | 1 |

CARRY OUTPUT "CO"

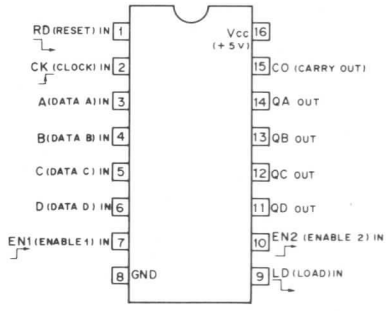



CO IS HIGH WHEN EN2 INPUT IS HIGH AND COUNT IS "15".

## SN74LS163AN (TI)

TTL PRESETTABLE SYNCHRONOUS 4-BIT BINARY COUNTER

— TOP VIEW —




MODE SELECTION

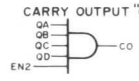
| CONTROL INPUTS | | | | MODE |
|---|---|---|---|---|
| RD | LD | EN1 | EN2 | |
| 0 | X | X | X | RESET (SYNCHRONOUS) |
| 1 | 0 | X | X | PRESET (SYNCHRONOUS) |
| 1 | 1 | 0 | X | NO COUNT |
| 1 | 1 | X | 0 | NO COUNT |
| 1 | 1 | 1 | 1 | COUNT |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

COUNT SEQUENCE

| COUNT | OUTPUTS | | | |
|---|---|---|---|---|
| | QD | QC | QB | QA |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 2 | 0 | 0 | 1 | 0 |
| 3 | 0 | 0 | 1 | 1 |
| 4 | 0 | 1 | 0 | 0 |
| 5 | 0 | 1 | 0 | 1 |
| 6 | 0 | 1 | 1 | 0 |
| 7 | 0 | 1 | 1 | 1 |
| 8 | 1 | 0 | 0 | 0 |
| 9 | 1 | 0 | 0 | 1 |
| 10 | 1 | 0 | 1 | 0 |
| 11 | 1 | 0 | 1 | 1 |
| 12 | 1 | 1 | 0 | 0 |
| 13 | 1 | 1 | 0 | 1 |
| 14 | 1 | 1 | 1 | 0 |
| 15 | 1 | 1 | 1 | 1 |

CARRY OUTPUT "CO"

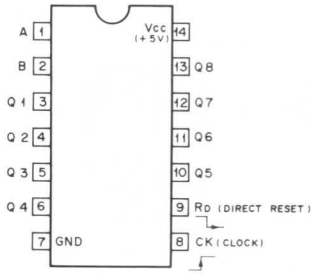



CO IS HIGH WHEN EN2 INPUT IS HIGH AND COUNT IS "15".

## SN74LS164N (TI)

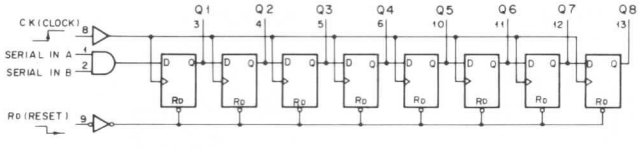
TTL 8-BIT PARALLEL-OUT SERIAL SHIFT REGISTER

— TOP VIEW —

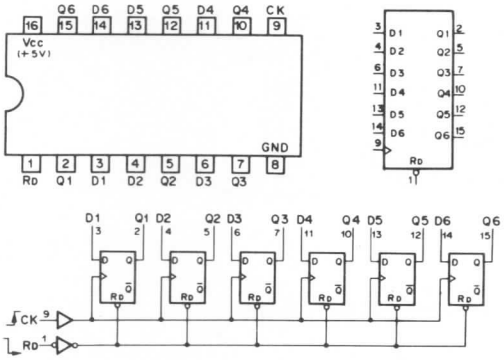



| INPUTS | | | | OUTPUTS | | | |
|---|---|---|---|---|---|---|---|
| RD | CK | A | B | Q1 | Q2 | ---- | Q8 |
| 0 | X | X | X | 0 | 0 | 0 | 0 |
| 1 | 0 | X | X | Q1o | Q2o | ---- | Q8o |
| 1 | ↓ | 1 | 1 | 1 | Q1n | ---- | Q7n |
| 1 | ↓ | 0 | X | 0 | Q1n | ---- | Q7n |
| 1 | ↓ | X | 0 | 0 | Q1n | ---- | Q7n |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE



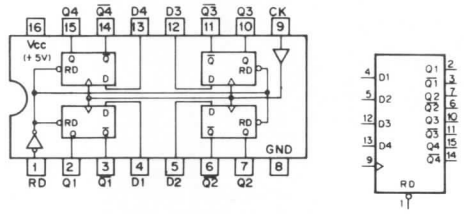
SN74LS174N (TI)
TTL D-TYPE FLIP-FLOP WITH DIRECT RESET
— TOP VIEW —




EACH FLIP-FLOP

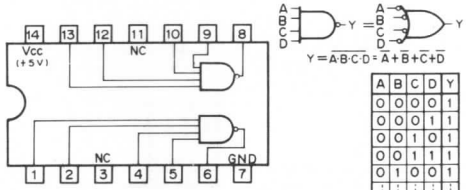
| INPUTS | | | OUT | |
|---|---|---|---|---|
| RD | CK | D | Q | |
| 0 | X | X | 0 | |
| 1 | ↓ | 0 | 0 | 0;LOW LEVEL |
| 1 | ↓ | 1 | 1 | 1;HIGH LEVEL |
| 1 | 0 | X | Q0 | X;DON'T CARE |

SN74LS175N (TI)
TTL D-TYPE FLIP-FLOP WITH CLEAR
— TOP VIEW —




| RD | CK | D | Q | Q̄ | |
|---|---|---|---|---|---|
| 0 | X | X | 0 | 1 | |
| 1 | ↓ | 1 | 1 | 0 | 0;LOW LEVEL |
| 1 | ↓ | 0 | 0 | 1 | 1;HIGH LEVEL |
| 1 | 0 | X | Q0 | Q̄0 | X;DON'T CARE |

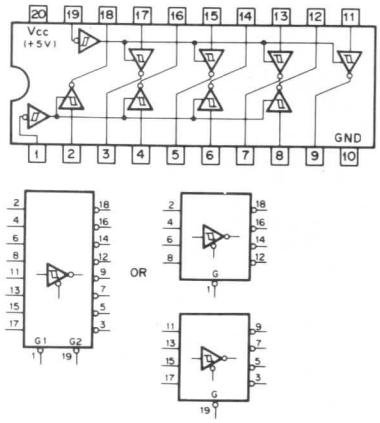
SN74LS20N (TI)
TTL 4-INPUT POSITIVE NAND GATE
— TOP VIEW —




| A | B | C | D | Y |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 0 | 1 |
| : | : | : | : | : |
| 1 | 1 | 0 | 1 | 1 |
| 1 | 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 | 0 |

0;LOW LEVEL
1;HIGH LEVEL

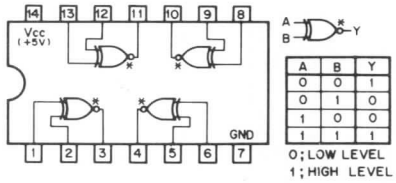
SN74LS240N (TI)
TTL 3-STATE SCHMITT TRIGGER INVERTER/LINE DRIVER
— TOP VIEW —




| G | A | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | X | HI-Z |

0;LOW LEVEL
1;HIGH LEVEL
X;DON'T CARE
HI-Z;HIGH IMPEDANCE

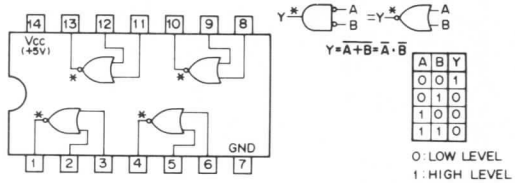
SN74LS266N (TI)
TTL 2-INPUT EXCLUSIVE-NOR GATE WITH OPEN-COLLECTOR OUTPUT
— TOP VIEW —




| A | B | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

0;LOW LEVEL
1;HIGH LEVEL

SN74LS33N (TI)
TTL 2-INPUT POSITIVE-NOR GATE WITH OPEN-COLLECTOR
— TOP VIEW —



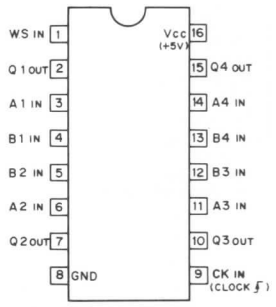

| A | B | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 0 |

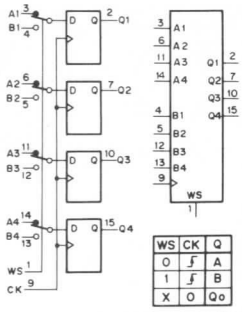
0:LOW LEVEL
1:HIGH LEVEL

## SN74LS399N (TI)

TTL QUAD 2-INPUT MULTIPLEXER WITH STORAGE

— TOP VIEW —



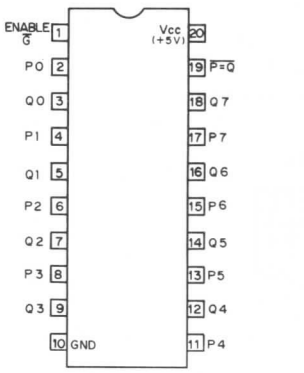

| WS | CK | Q |
|---|---|---|
| 0 | ∫ | A |
| 1 | ∫ | B |
| X | 0 | Q0 |

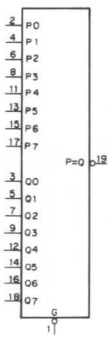
WS; WORD SELECT

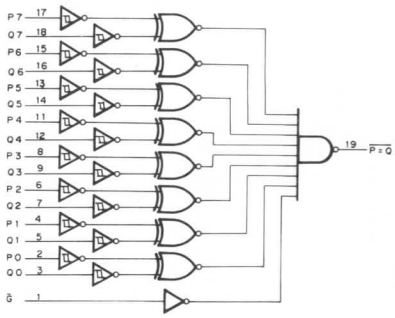
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

## SN74LS688N (TI)

TTL 8-BIT MAGNITUDE COMPARATOR



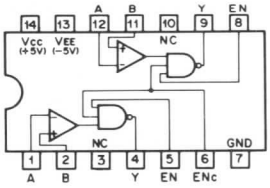

| INPUTS | | OUTPUT |
|---|---|---|
| P, Q | G | P=Q |
| P=Q | 0 | 0 |
| P>Q | 0 | 1 |
| P<Q | 0 | 1 |
| X | 1 | 1 |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

## SN75207BN (TI)

BIPOLAR LINE RECEIVER (TTL COMPATIBLE)

— TOP VIEW —



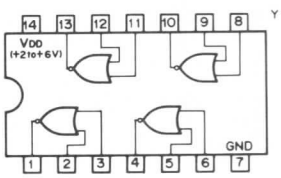

| INPUTS | | | OUT |
|---|---|---|---|
| B − A | EN | ENc | Y |
| B − A ≧ 10mV | X | 0 | 1 |
| | 0 | X | 1 |
| | 1 | 1 | 0 |
| \|B − A\| < 10mV | X | 0 | 1 |
| | 0 | X | 1 |
| | 1 | 1 | * |
| B − A ≦ −10mV | X | X | 1 |

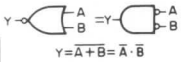
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
*; INDETERMINATE

## TC74HC02F (TOSHIBA) FLAT PACKAGE

C MOS 2-INPUT POSITIVE-NOR GATE

— TOP VIEW —




$Y = \overline{A + B} = \overline{A} \cdot \overline{B}$

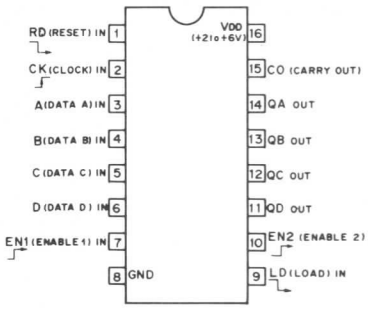
| A | B | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 0 |

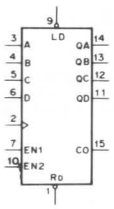
0; LOW LEVEL
1; HIGH LEVEL

## TC74HC161F (TOSHIBA) FLAT PACKAGE

C-MOS SYNCHRONOUS PRESETTABLE 4-BIT BINARY COUNTER

— TOP VIEW —


RD (RESET) IN 1
CK (CLOCK) IN 2
A (DATA A) IN 3
B (DATA B) IN 4
C (DATA C) IN 5
D (DATA D) IN 6
EN1 (ENABLE 1) IN 7
8 GND
VDD (+2 to +6V) 16
15 CO (CARRY OUT)
14 QA OUT
13 QB OUT
12 QC OUT
11 QD OUT
10 EN2 (ENABLE 2) IN
9 LD (LOAD) IN

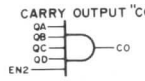



MODE SELECTION

| CONTROL INPUTS | | | | MODE |
|---|---|---|---|---|
| RD | LD | EN1 | EN2 | |
| 0 | X | X | X | RESET (ASYNCHRONOUS) |
| 1 | 0 | X | X | PRESET (SYNCHRONOUS) |
| 1 | 1 | 0 | X | NO COUNT |
| 1 | 1 | X | 0 | NO COUNT |
| 1 | 1 | 1 | 1 | COUNT |

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

CARRY OUTPUT "CO"




CO IS HIGH WHEN EN2 INPUT IS HIGH AND COUNT IS "15".

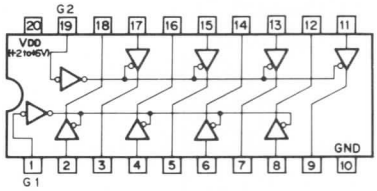
COUNT SEQUENCE

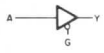
| COUNT | OUTPUTS | | | |
|---|---|---|---|---|
| | QD | QC | QB | QA |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 2 | 0 | 0 | 1 | 0 |
| 3 | 0 | 0 | 1 | 1 |
| 4 | 0 | 1 | 0 | 0 |
| 5 | 0 | 1 | 0 | 1 |
| 6 | 0 | 1 | 1 | 0 |
| 7 | 0 | 1 | 1 | 1 |
| 8 | 1 | 0 | 0 | 0 |
| 9 | 1 | 0 | 0 | 1 |
| 10 | 1 | 0 | 1 | 0 |
| 11 | 1 | 0 | 1 | 1 |
| 12 | 1 | 1 | 0 | 0 |
| 13 | 1 | 1 | 0 | 1 |
| 14 | 1 | 1 | 1 | 0 |
| 15 | 1 | 1 | 1 | 1 |

## TC74HC244P (TOSHIBA)
## TC74HCT244P (TOSHIBA)

C-MOS BUS BUFFER WITH 3-STATE OUTPUT

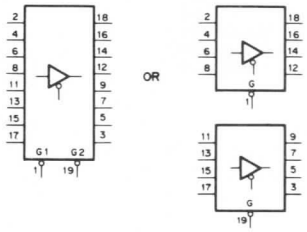
— TOP VIEW —



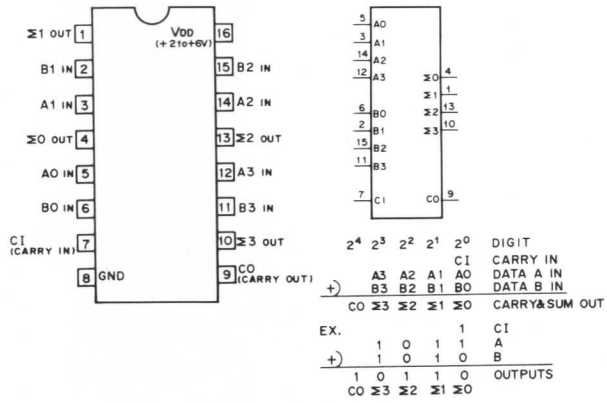




| G | A | Y |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | X | HI-Z |

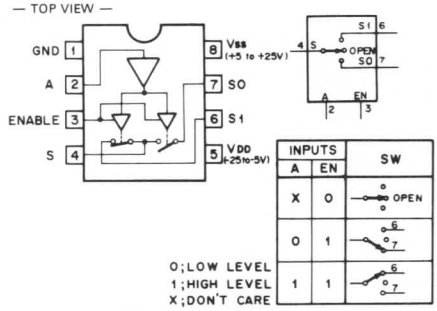
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE



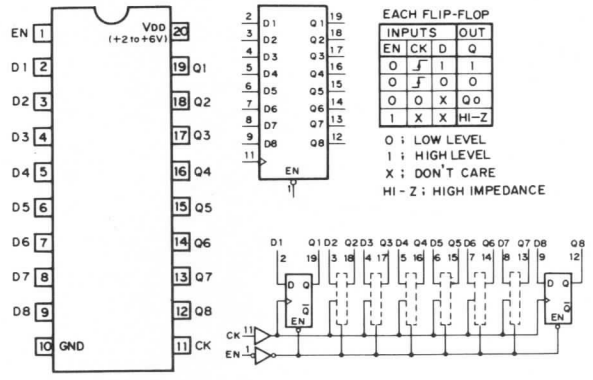
TC74HC283P (TOSHIBA)
C-MOS 4-BIT FULL ADDER
— TOP VIEW —



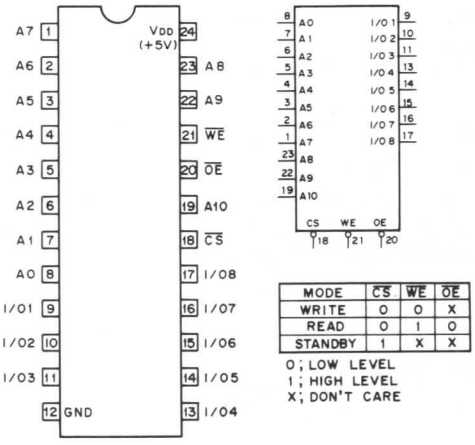

TL607CP (TI)
P-MOS ANALOG SWITCH
— TOP VIEW —



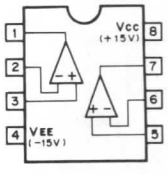

TC74HC574F (TOSHIBA)
TC74HCT574P (TOSHIBA)
C-MOS 3-STATE D-TYPE EDGE-TRIGGERED FLIP-FLOP
— TOP VIEW —



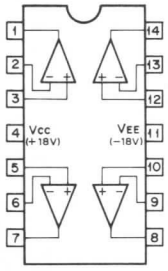

TMM2015AP-90 (TOSHIBA) (ACCESS TIME = 90 nS)
N-MOS 16K STATIC RAM (2048x8)
— TOP VIEW —

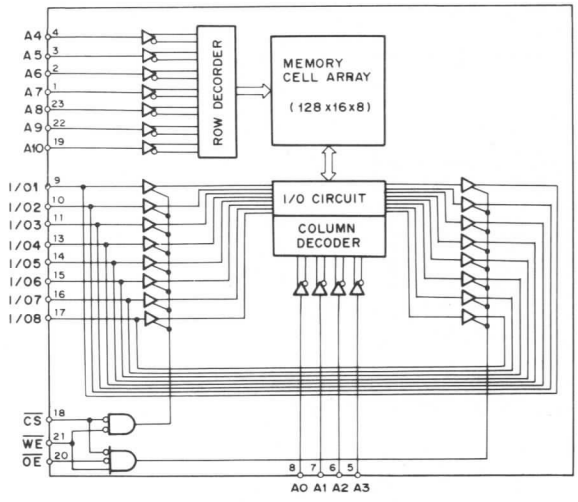



TL082CP (TI)
uPC4082C (NEC)
OPERATIONAL AMPLIFIER
(J FET-INPUT)
— TOP VIEW —

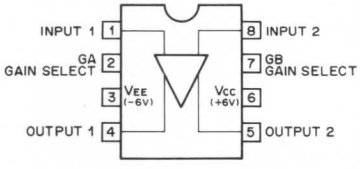



TL084CN (TI)
OPERATIONAL AMPLIFIER
(J FET-INPUT)
— TOP VIEW —

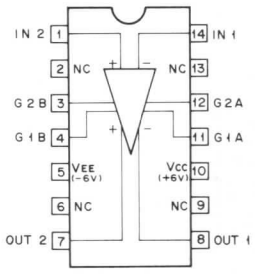


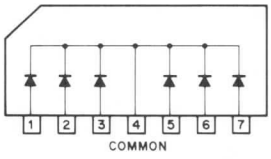

TL592P (TI)
DIFFERENTIAL VIDEO AMPLIFIER
— TOP VIEW —



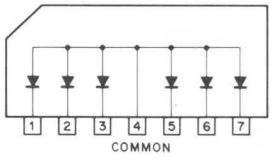
uA733CN (TI)
DIFFERENTIAL VIDEO AMP
— TOP VIEW —



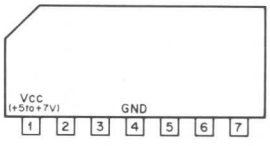

uPA54H (NEC)
DIODE ARRAY
— SIDE VIEW —

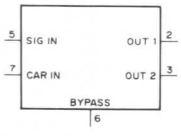



uPA64H (NEC)
DIODE ARRAY
— SIDE VIEW —

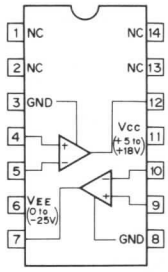



uPC1037H (NEC)
DOUBLE-BALANCED MODULATOR
— SIDE VIEW —

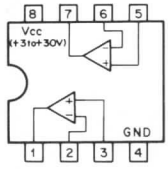


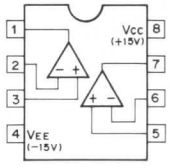

uPC319C (NEC)
DUAL VOLTAGE COMPARATOR
— TOP VIEW —



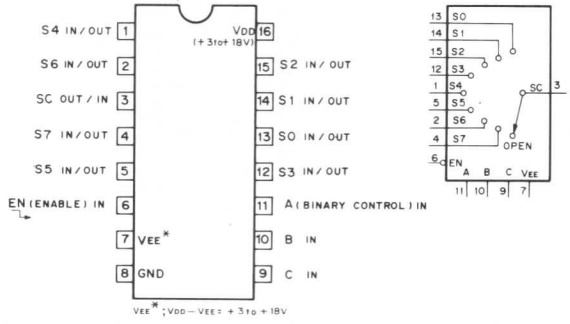

uPC358C (NEC)
DUAL OPERATIONAL AMPLIFIERS
— TOP VIEW —




uPC4557C (NEC)
OPERATIONAL AMPLIFIER (WIDE BAND, LOW NOISE)
— TOP VIEW —



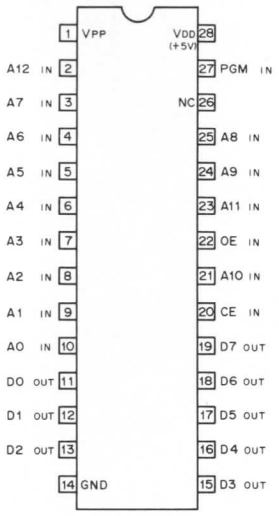

uPD4051BC (NEC)
C-MOS 8-CHANNEL MULTIPLEXER/DEMULTIPLEXER
— TOP VIEW —

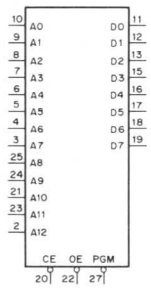


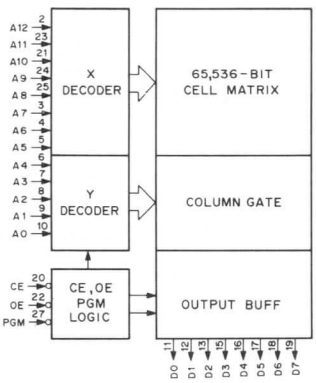

| EN | C | B | A | "ON" CHANNEL |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 | 2 |
| 0 | 0 | 1 | 1 | 3 |
| 0 | 1 | 0 | 0 | 4 |
| 0 | 1 | 0 | 1 | 5 |
| 0 | 1 | 1 | 0 | 6 |
| 0 | 1 | 1 | 1 | 7 |
| 1 | X | X | X | OPEN |

0 : LOW LEVEL
1 : HIGH LEVEL
X : DON'T CARE

HN27C64G-20 (HITACHI) (ACCESS TIME = 200 nS)
MBM27C64-25 (FUJITSU) (ACCESS TIME = 250 nS)
C-MOS 64K (8K-8) ERASABLE PROM WITH 3-STATE OUTPUTS
— TOP VIEW —



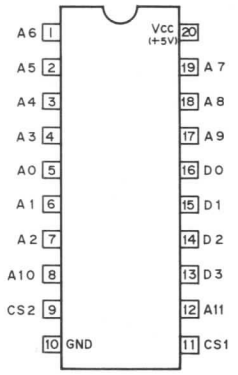



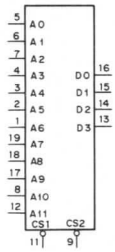

A0-A12 ; ADDRESS
CE ; CHIP ENABLE
D0-D7 ; DATA OUTPUT
OE ; OUTPUT ENABLE
PGM ; PROGRAM ENABLE
VPP ; PROGRAM VOLTAGE

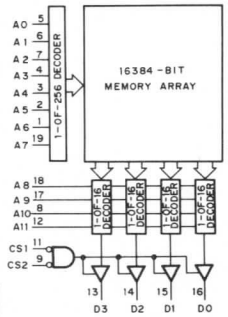
| An | CE | OE | PGM | VPP | Dn | FUNCTION |
|---|---|---|---|---|---|---|
| An | 0 | 0 | 1 | +5V | D OUT | READ |
| An | 0 | 1 | 1 | +5V | HI-Z | OUTPUT DISABLE |
| An | 0 | 0 | 0 | +5V | HI-Z | OUTPUT DISABLE |
| X | 1 | X | X | +5V | HI-Z | STANDBY |
| An | 0 | X | ⊓ | +21V | DIN | PGM |
| An | 0 | 0 | 1 | +21V | D OUT | PGM VERIFY |
| X | 1 | X | X | +21V | HI-Z | PGM INH |

0; LOW LEVEL
1 ; HIGH LEVEL
X; DON'T CARE
HI-Z, HIGH IMPEDANCE

MB7134H (FUJITSU) (ACCESS TIME = 55 nS)
16384-BIT (4096x4) PROM WITH 3-STATE OUTPUT
— TOP VIEW —



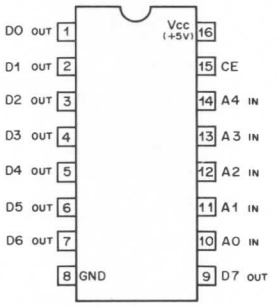



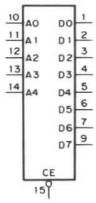

| CHIP SEL | | OUTPUT |
|---|---|---|
| CS2 | CS1 | |
| 0 | 0 | ENABLE |
| X | 1 | HI-Z |
| 1 | X | |

A0-A11 ; ADDRESS INPUTS
D0-D3 ; DATA OUTPUTS
CS1,CS2 ; CHIP SELECT INPUTS

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE

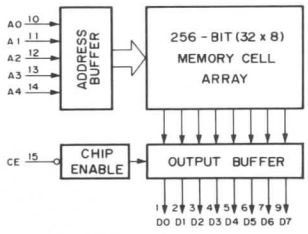
MB7112E (FUJITSU) (ACCESS TIME = 35 nS)
256-BIT (32x8) PROM WITH 3-STATE OUTPUT
— TOP VIEW —




| CE | OUTPUT |
|---|---|
| 0 | ENABLE |
| 1 | HI-Z |

0;LOW LEVEL
1;HIGH LEVEL
HI-Z;HIGH IMPEDANCE

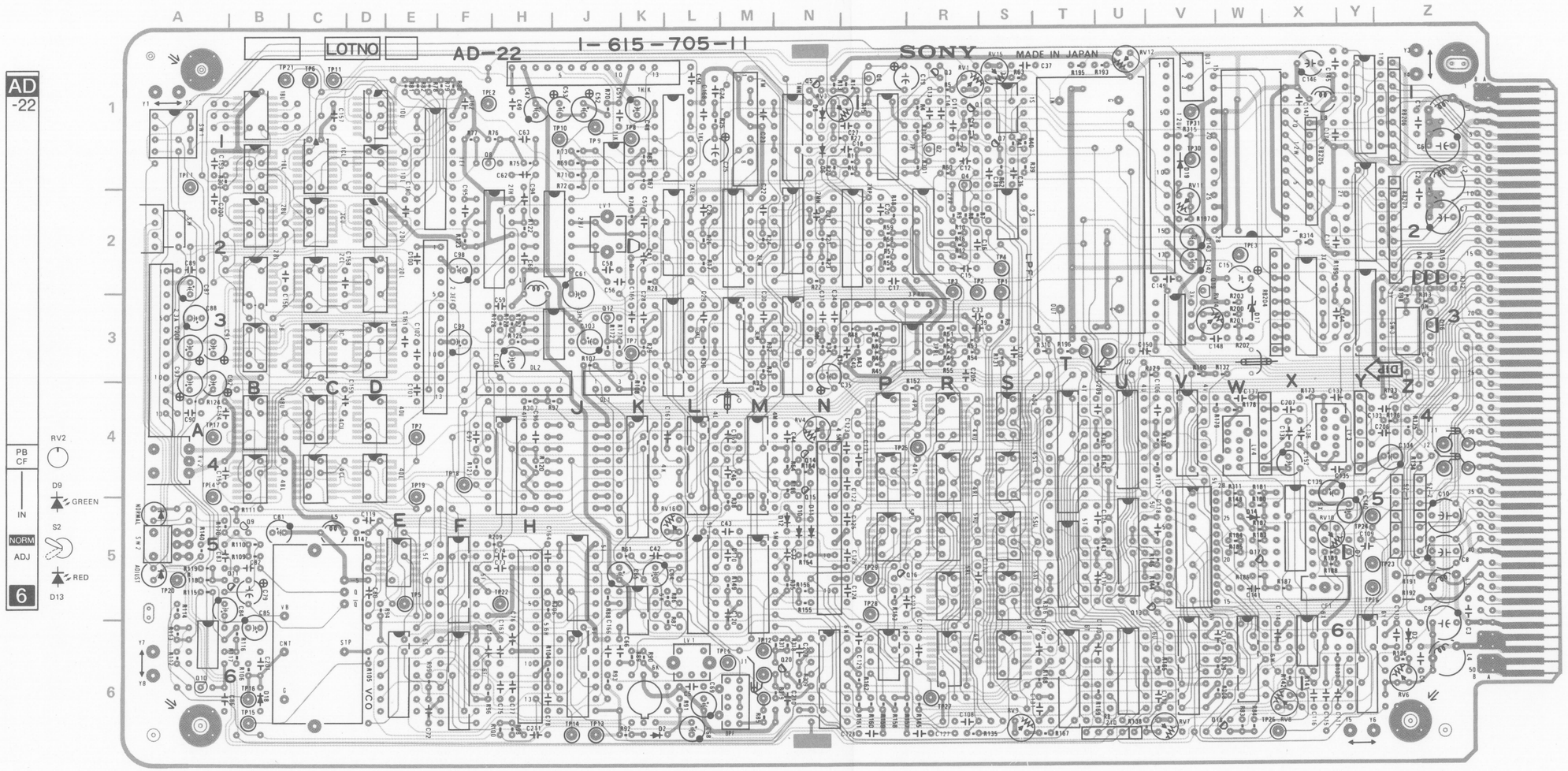



A0-A4; ADDRESS INPUTS
D0-D7; DATA OUTPUTS
CE; CHIP ENABLE INPUT

# SECTION C
# SCHEMATIC DIAGRAMS & BOARD LAYOUTS

## AD-22 BOARD (1-615-705-11)

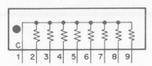
Component Side




■ 1-615-705-11 COMPONENT SIDE

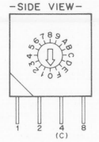
■ 1-615-705-11 SOLDER SIDE

**RB204, 205, 206, 207**



**RB210**

**S4**




| POSITION | PIN NO 8 | 4 | 2 | 1 |
|---|---|---|---|---|
| 0 | ○ | ○ | ○ | ○ |
| 1 | ○ | ○ | ○ | |
| 2 | ○ | ○ | | ○ |
| 3 | ○ | ○ | | |
| 4 | ○ | | ○ | ○ |
| 5 | ○ | | ○ | |
| 6 | ○ | | | ○ |
| 7 | ○ | | | |
| 8 | | ○ | ○ | ○ |
| 9 | | ○ | ○ | |
| A | | ○ | | ○ |
| B | | ○ | | |
| C | | | ○ | ○ |
| D | | | ○ | |
| E | | | | ○ |
| F | | | | |

○=ON

TYPE S-1041

C-3

AD-22 (1-615-705-11)

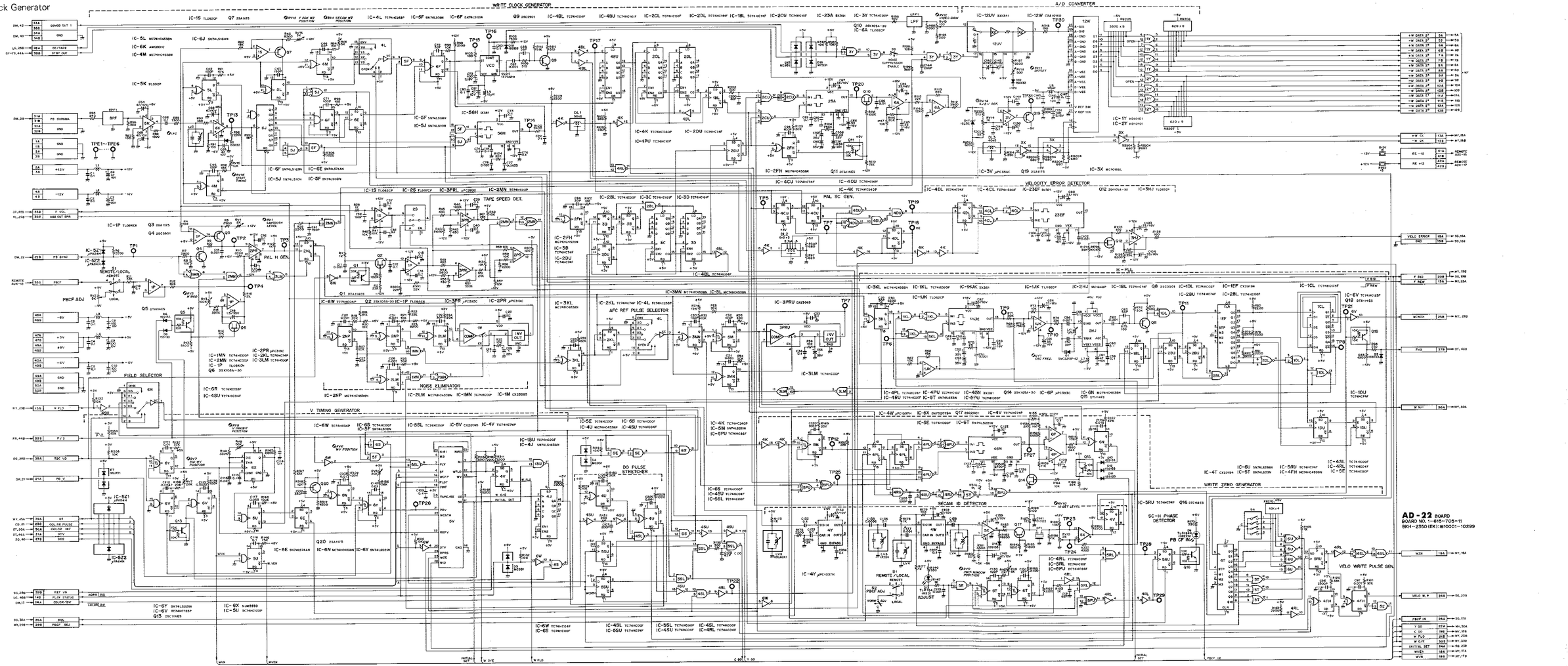
BKH-2350(EK)

| | | |
|---|---|---|
| BPF1 | 6M | |
| CF1 | 5X | |
| D1 | 2K | |
| D2 | 6K | |
| D3 | 6Z | |
| D4 | 2Z | |
| D5 | 2Z | |
| D6 | 1N | |
| D7 | 5Y | |
| D8 | 1N | |
| D9 | 5A | |
| D10 | 5N | |
| D11 | 5N | |
| D12 | 5N | |
| D13 | 5A | |
| D14 | 5W | |
| D15 | 2Z | |
| D16 | 3Z | |
| D17 | 3W | |
| D18 | 6B | |
| D19 | 1V | |
| DL1 | 4J | |
| DL2 | 3H | |
| DL3 | 1V | |
| IC1BL | | |
| IC1BU | | |
| IC1CL | | |
| IC1DL | | |
| IC1DU | | |
| IC1EF | | |
| IC1HJK | | |
| IC1JK | | |
| IC1KL | | |
| IC1M | | |
| IC1MN | | |
| IC1P | | |
| IC1S | | |
| IC1Y | | |
| IC2BL | | |
| IC2BU | | |
| IC2CL | | |
| IC2CU | | |
| IC2DL | | |
| IC2DU | | |
| IC2FH | | |
| IC2HJ | | |
| IC2KL | | |
| IC2LM | | |
| IC2MN | | |
| IC2NP | | |
| IC2PR | | |
| IC2S | | |
| IC2Y | | |
| IC3B | | |
| IC3C | | |
| IC3D | | |
| IC3HJ | | |
| IC3KL | | |
| IC3LM | | |
| IC3MN | | |
| IC3PRL | | |
| IC3PRU | | |
| IC3V | | |
| IC3X | | |
| IC3Y | | |
| IC4BL | | |
| IC4BU | | |
| IC4CL | | |
| IC4CU | | |
| IC4DL | | |
| IC4DU | | |
| IC4FH | | |
| IC4J | | |
| IC4K | | |
| IC4L | | |
| IC4M | | |
| IC4PL | | |
| IC4PU | | |
| IC4RL | | |
| IC4RU | | |
| IC4SL | | |
| IC4SU | | |
| IC4T | | |
| IC4U | | |
| IC4V | | |
| IC4W | | |
| IC4Y | | |
| IC5E | | |
| IC5F | | |
| IC5J | | |
| IC5K | | |
| IC5L | | |
| IC5M | | |
| IC5PU | | |
| IC5RL | | |
| IC5RU | | |
| IC5SL | | |
| IC5SU | | |
| IC5T | | |
| IC5U | | |
| IC5V | | |
| IC5X | | |
| IC5Z1 | | |
| IC5Z2 | | |
| IC6A | | |
| IC6E | | |
| IC6F | | |
| IC6J | | |
| IC6K | | |
| IC6N | | |
| IC6P | | |
| IC6R | | |
| IC6S | | |
| IC6T | | |
| IC6U | | |
| IC6V | | |
| IC6W | | |
| IC6X | | |
| IC6Y | | |
| IC12UV | | |
| IC12W | | |
| IC23A | | |
| IC23EF | | |
| IC45N | | |
| IC56H | | |
| LPF1 | 2T | |
| LV1 | 2J | |
| LV2 | 6L | |
| LV3 | 4X | |
| LV4 | 4W | |
| Q1 | 1R | |
| Q2 | 1R | |
| Q3 | 1R | |
| Q4 | 1R | |
| Q5 | 1N | |
| Q6 | 1P | |
| Q7 | 1S | |
| Q8 | 1F | |
| Q9 | 5B | |
| Q10 | 6A | |
| Q11 | 5A | |
| Q12 | 3J | |
| Q13 | 5V | |
| Q14 | 4N | |
| Q15 | 4N | |
| Q16 | 5P | |
| Q17 | 5W | |
| Q18 | 6W | |
| Q19 | 3V | |
| Q20 | 6N | |
| RB204 | 3X | |
| RB205 | 1X | |
| RB206 | 1Z | |
| RB207 | 2Z | |
| RB210 | 6U | |
| RV1 | 1R | |
| RV2 | 4A | |
| RV3 | 1N | |
| RV4 | 4N | |
| RV6 | 6Z | |
| RV8 | 6X | |
| RV9 | 6S | |
| RV10 | 5X | |
| RV11 | 2V | |
| RV12 | 1U | |
| RV14 | 3V | |
| RV15 | 1S | |
| RV16 | 5L | |
| S1 | 1A | |
| S2 | 5A | |
| S3 | 3Z | |
| S4 | 2A | |
| TP1 | 3S | |
| TP2 | 3R | |
| TP3 | 3R | |
| TP4 | 2S | |
| TP5 | 5E | |
| TP6 | 1C | |
| TP7 | 4E | |
| TP8 | 1K | |
| TP9 | 1J | |
| TP10 | 1J | |
| TP11 | 1C | |
| TP12 | 6M | |
| TP13 | 6J | |
| TP14 | 6J | |
| TP15 | 6B | |
| TP16 | 6B | |
| TP17 | 4A | |
| TP18 | 4F | |
| TP19 | 4E | |
| TP20 | 5A | |
| TP21 | 1B | |
| TP22 | 5H | |
| TP23 | 5Y | |
| TP24 | 5Y | |
| TP25 | 4R | |
| TP26 | 6X | |
| TP27 | 6R | |
| TP28 | 5P | |
| TP29 | 5P | |
| TP30 | 1V | |
| TP31 | 1V | |
| TP32 | 3K | |
| TPE1 | 1A | |
| TPE2 | 1F | |
| TPE3 | 2W | |
| TPE4 | 4A | |
| TPE5 | 6M | |
| TPE6 | 5Y | |
| VCO1 | 6C | |

C-4

## AD-22 BOARD

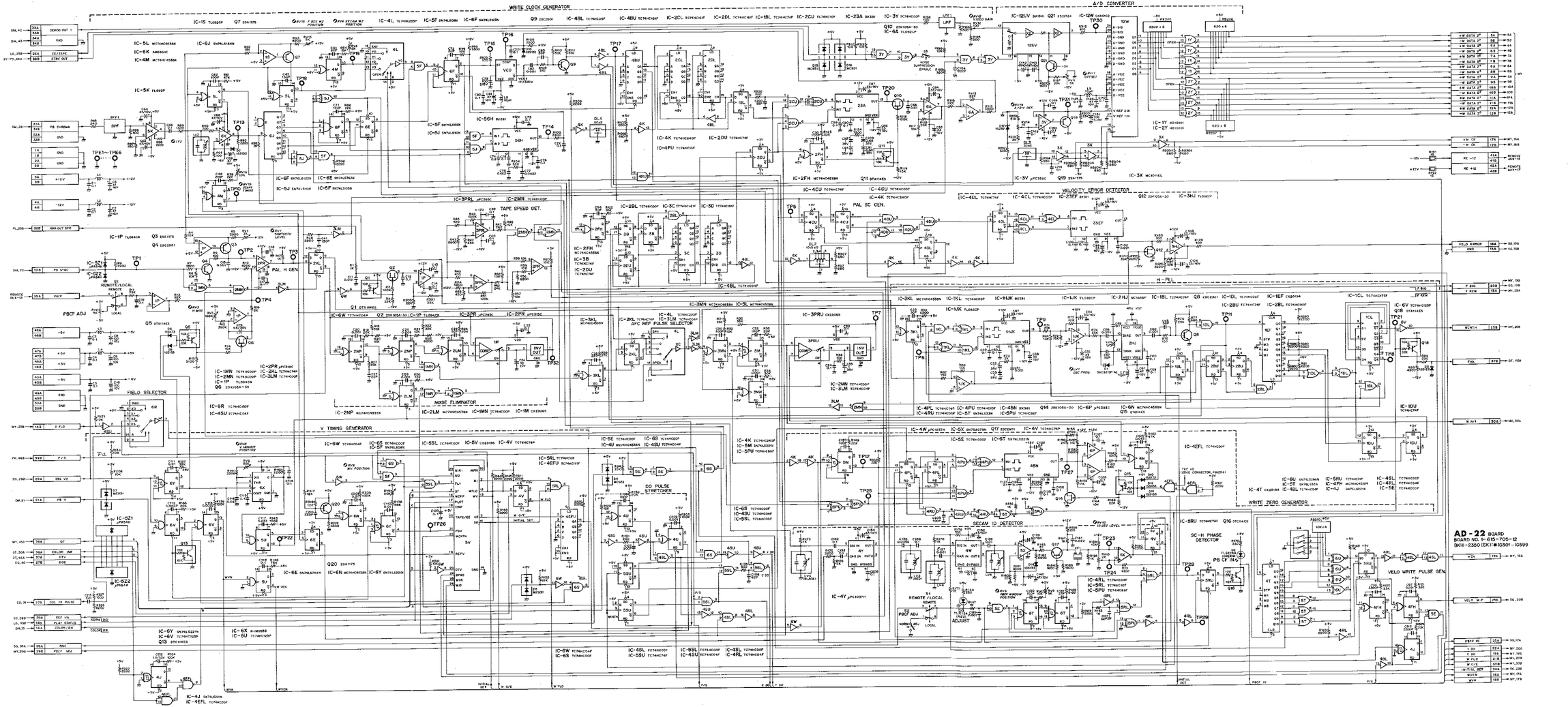
A/D Converter
Write Clock Generator




C-5 C-6 C-7 (1/13)

## AD-22 BOARD

A/D Converter
Write Clock Generator



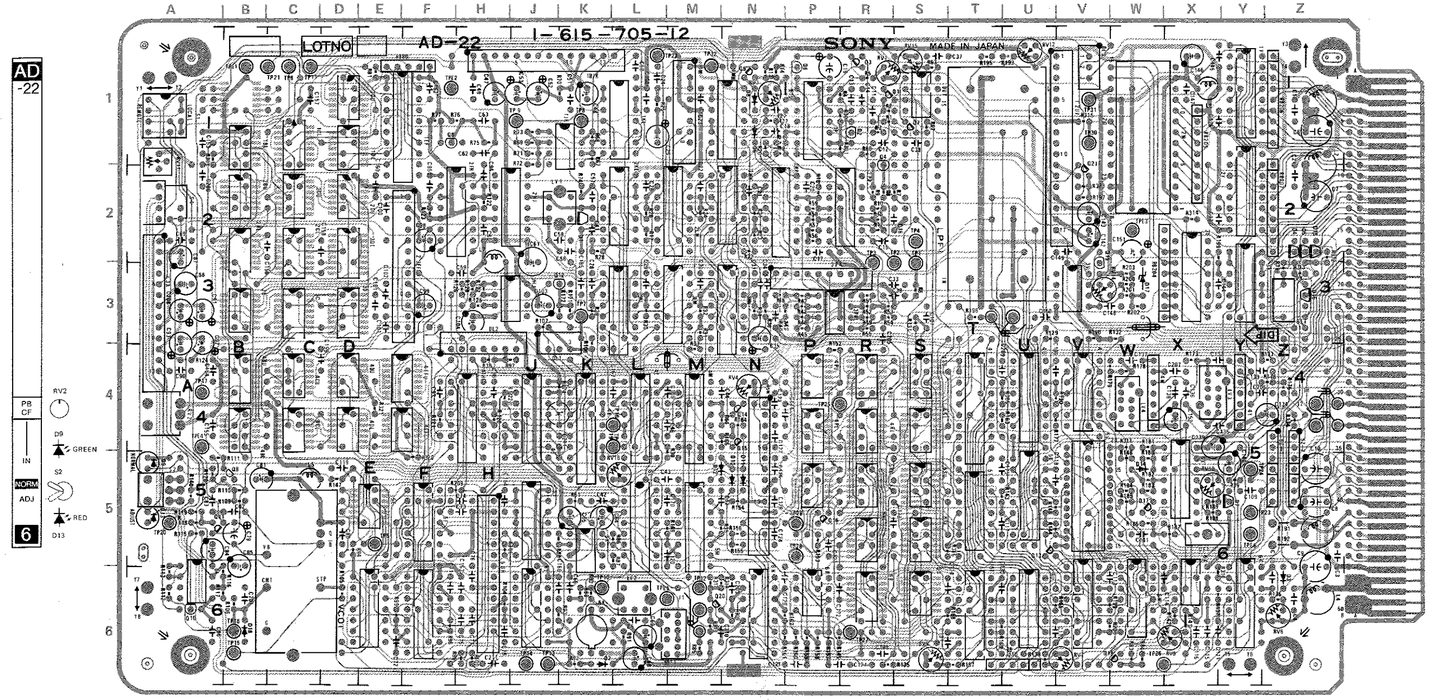

C-7 (5/13) C-7 (6/13) C-7 (7/13)

1-615-705-12

CARD RACK AD-22 AD-22 CARD RACK 1-615-705-12

## AD-22 BOARD (1-615-705-12)

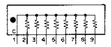
Component Side




■ 1-615-705-12 COMPONENT SIDE

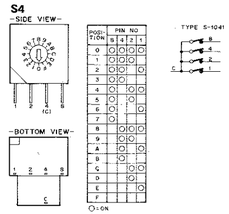
■ 1-615-705-12 SOLDER SIDE

**RB80, 204, 205, 206, 207**



**RB210**

**S4**



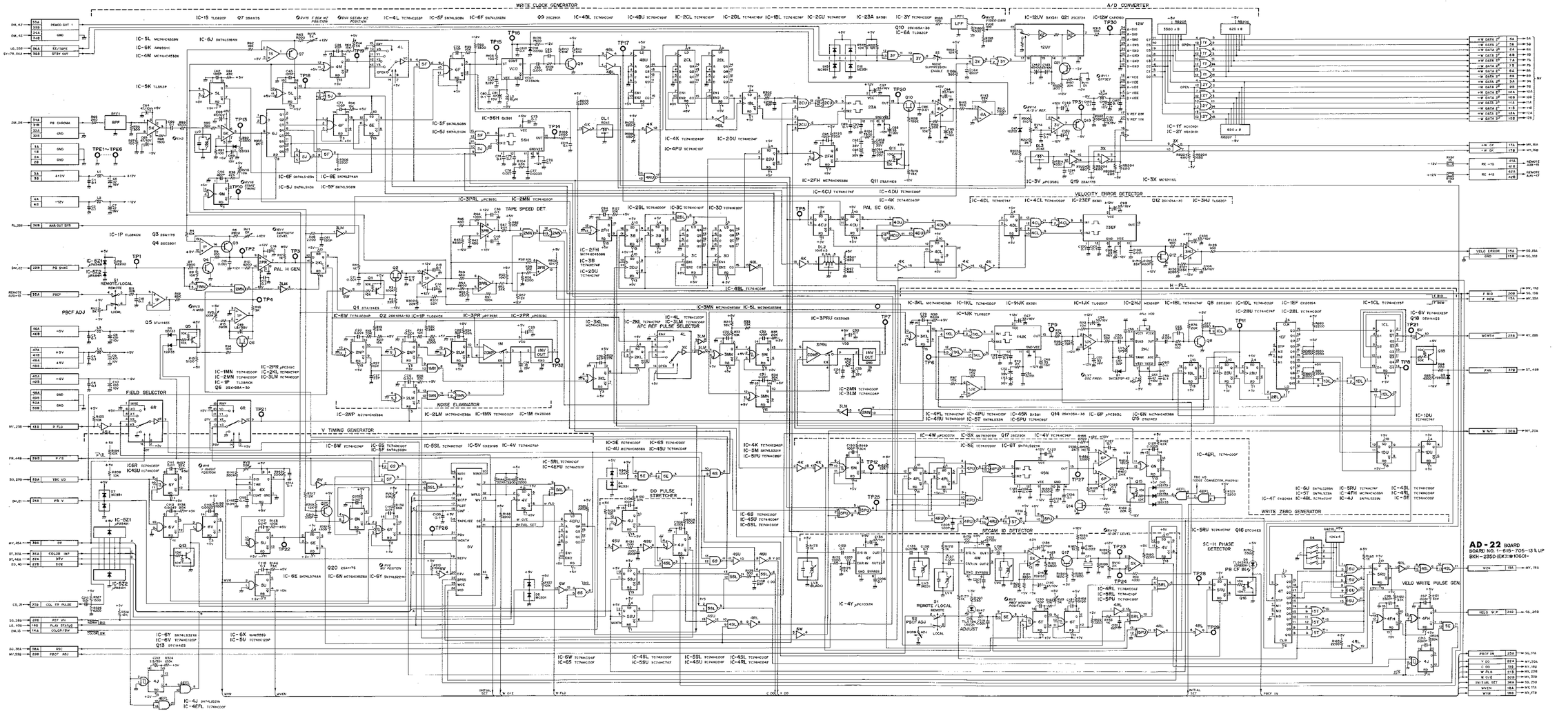

AD-22 (1-615-705-12)

BKH-2350(EK)

| | | |
|---|---|---|
| BPF1 | 6M | |
| CP1 | 5X | |
| D1 | 2K | |
| D2 | 6K | |
| D3 | 6S | |
| D4 | 2S | |
| D5 | 1S | |
| D6 | 1N | |
| D7 | 5Y | |
| D8 | 1N | |
| D9 | 5A | |
| D10 | 5N | |
| D11 | 5N | |
| D12 | 5N | |
| D13 | 5A | |
| D14 | 5W | |
| D15 | 2S | |
| D16 | 3Z | |
| D17 | 3W | |
| D18 | 6B | |
| DL1 | 4J | |
| DL2 | 3H | |
| DL3 | 1V | |
| IC1BL | | |
| IC1BU | | |
| IC1CL | | |
| IC1EL | | |
| IC1DU | | |
| IC1EF | | |
| IC1HJK | | |
| IC1JK | | |
| IC1KL | | |
| IC1M | | |
| IC1MN | | |
| IC1P | | |
| IC1S | | |
| IC1Y | | |
| IC2BL | | |
| IC2BU | | |
| IC2CL | | |
| IC2CU | | |
| IC2EL | | |
| IC2DU | | |
| IC2FH | | |
| IC2HJ | | |
| IC2KL | | |
| IC2LM | | |
| IC2MN | | |
| IC2NP | | |
| IC2PR | | |
| IC2Y | | |
| IC3B | | |
| IC3C | | |
| IC3D | | |
| IC3HJ | | |
| IC3KL | | |
| IC3LM | | |
| IC3MN | | |
| IC3PRL | | |
| IC3PRU | | |
| IC3V | | |
| IC3X | | |
| IC3Y | | |
| IC4DL | | |
| IC4DU | | |
| IC4EL | | |
| IC4DU | | |
| IC4EFL | | |
| IC4EFU | | |
| IC4FH | | |
| IC4J | | |
| IC4K | | |
| IC4L | | |
| IC4M | | |
| IC4PL | | |
| IC4PU | | |
| IC4RL | | |
| IC4RU | | |
| IC4SL | | |
| IC4SU | | |
| IC4T | | |
| IC4U | | |
| IC4V | | |
| IC4W | | |
| IC4Y | | |
| IC5K | | |
| IC5P | | |
| IC5J | | |
| IC5K | | |
| IC5L | | |
| IC5M | | |
| IC5MU | | |
| IC5RL | | |
| IC5RU | | |
| IC5SL | | |
| IC5SU | | |
| IC5T | | |
| IC5U | | |
| IC5V | | |
| IC5X | | |
| IC5Z1 | | |
| IC5Z2 | | |
| IC6A | | |
| IC6E | | |
| IC6F | | |
| IC6J | | |
| IC6K | | |
| IC6M | | |
| IC6P | | |
| IC6R | | |
| IC6S | | |
| IC6T | | |
| IC6U | | |
| IC6V | | |
| IC6W | | |
| IC6X | | |
| IC6Y | | |
| IC12UV | | |
| IC12W | | |
| IC23A | | |
| IC23EF | | |
| IC45N | | |
| IC56H | | |
| LPF1 | 2T | |
| LV1 | 2J | |
| LV2 | 6L | |
| LV3 | 4K | |
| LV4 | 4W | |
| Q1 | 1R | |
| Q2 | 1R | |
| Q3 | 1R | |
| Q4 | 1R | |
| Q5 | 1N | |
| Q6 | 1P | |
| Q7 | 1S | |
| Q8 | 1P | |
| Q9 | 5B | |
| Q10 | 6A | |
| Q11 | 5A | |
| Q12 | 3J | |
| Q13 | 5U | |
| Q14 | 4N | |
| Q15 | 4N | |
| Q16 | 5P | |
| Q17 | 5W | |
| Q18 | 6W | |
| Q19 | 3V | |
| Q20 | 6M | |
| Q21 | 2V | |
| RB80 | 1F | |
| RB204 | 3W | |
| RB205 | 1Z | |
| RB206 | 1Z | |
| RB207 | 2Z | |
| RB210 | 6U | |
| RV1 | 1R | |
| RV2 | 4A | |
| RV3 | 1N | |
| RV4 | 4N | |
| RV6 | 6E | |
| RV8 | 6X | |
| RV9 | 6S | |
| RV10 | 5X | |
| RV11 | 1A | |
| RV12 | 1U | |
| RV14 | 3V | |
| RV15 | 1S | |
| RV16 | 5L | |
| S1 | 1A | |
| S2 | 5A | |
| S3 | 3E | |
| S4 | 2A | |
| TP1 | 3S | |
| TP2 | 3R | |
| TP3 | 3R | |
| TP4 | 2S | |
| TP5 | 5R | |
| TP6 | 1C | |
| TP7 | 3K | |
| TP8 | 1K | |
| TP9 | 1J | |
| TP10 | 6K | |
| TP11 | 1C | |
| TP12 | 6N | |
| TP13 | 6J | |
| TP14 | 6J | |
| TP15 | 6B | |
| TP16 | 6B | |
| TP17 | 4A | |
| TP18 | 4L | |
| TP19 | 4L | |
| TP20 | 5A | |
| TP21 | 1B | |
| TP22 | 1L | |
| TP23 | 5Y | |
| TP24 | 5Y | |
| TP25 | 4P | |
| TP26 | 6X | |
| TP27 | 6R | |
| TP28 | 5P | |
| TP29 | 5P | |
| TP30 | 1V | |
| TP31 | 1V | |
| TP32 | 1M | |
| TPB1 | 1B | |
| TPB2 | 1P | |
| TPE3 | 2W | |
| TPE4 | 4A | |
| TPE5 | 6R | |
| TPE6 | 5Y | |
| VC01 | 6C | |

## AD-22 BOARD

A/D Converter
Write Clock Generator




C-7 (11/13) C-7 (12/13) C-7 (13/13)

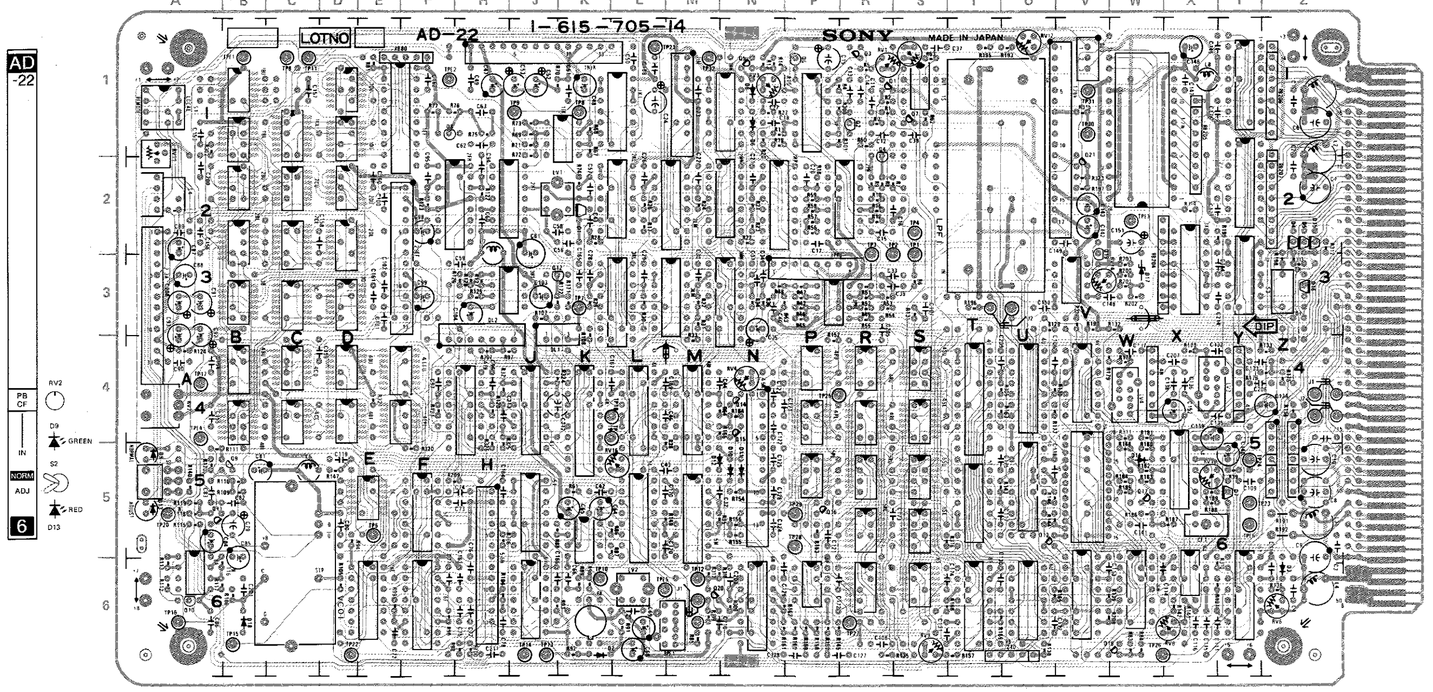
1-615-705-14

CARD RACK AD-22

AD-22 CARD RACK 1-615-705-14

## AD-22 BOARD (1-615-705-14)

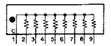
Component Side




1-615-705-14 COMPONENT SIDE

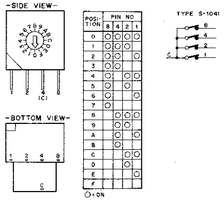
1-615-705-14 SOLDER SIDE

**RB80, 204, 205, 206, 207**



**RB210**

**S4**




TYPE S-1041



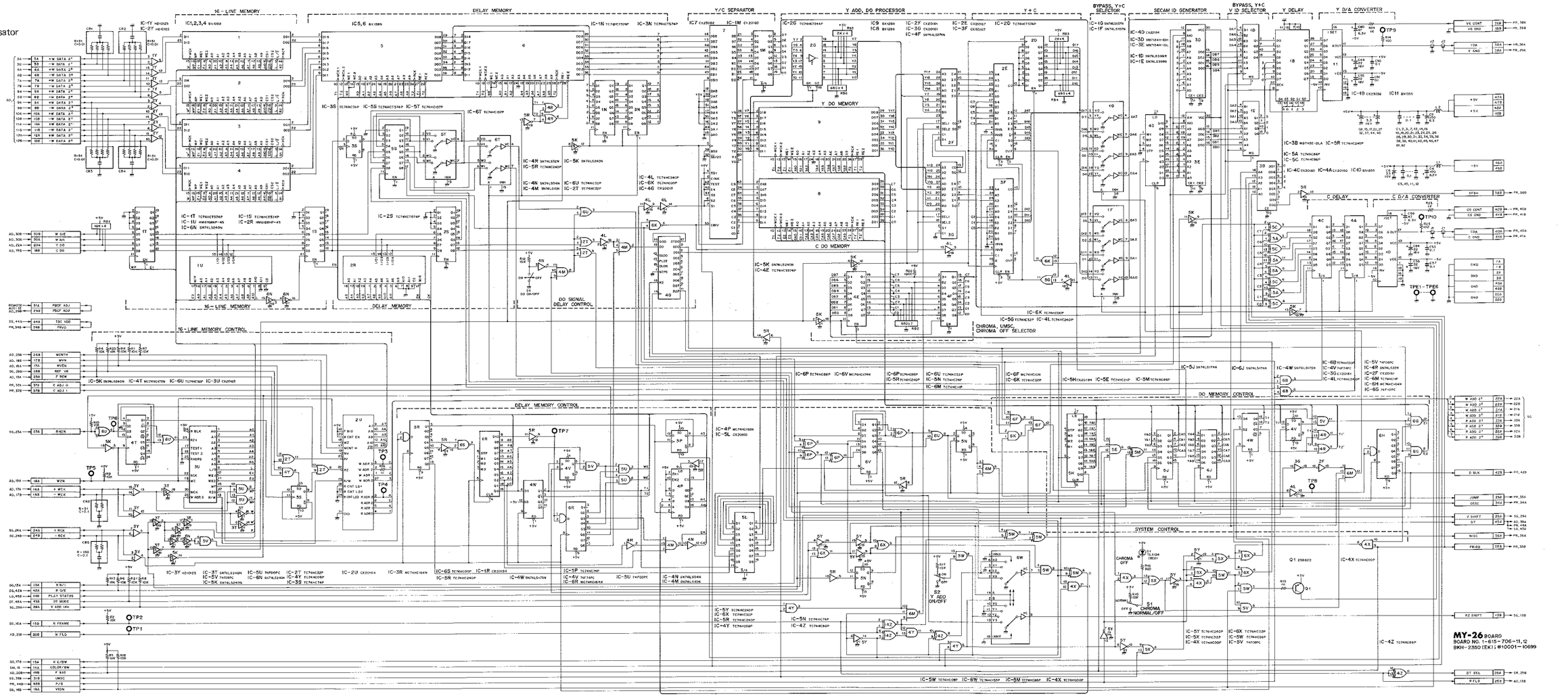
AD-22 (1-615-705-13 & UP)

BKH-2350(BK)

| | | |
|---|---|---|
| BPP1 | 6M | IC6H |
| | | IC6P |
| CP1 | 5X | IC6R |
| | | IC6S |
| | | IC6F |
| D1 | 2K | IC6Y |
| D2 | 6K | IC6U |
| D3 | 6S | IC6V |
| D4 | 2T | IC6W |
| D5 | 2S | IC6X |
| D6 | 1N | IC6Y |
| D7 | 5Y | IC12UV |
| D8 | 1N | IC12W |
| D9 | 5A | IC23A |
| D10 | 5N | IC23BP |
| D11 | 5N | IC45H |
| D12 | 5N | IC56H |
| D13 | 5A | |
| D14 | 5N | LPF1 2T |
| D15 | 2S | |
| D16 | 3S | LV1 2J |
| D17 | 3M | LV2 6L |
| D18 | 6B | LV3 4K |
| | | LV4 4W |
| DL1 | 4J | |
| DL2 | 3R | Q1 1R |
| DL3 | 1V | Q2 1R |
| | | Q3 1R |
| IC1BL | | Q4 1R |
| IC1CL | | Q5 1M |
| IC1DL | | Q6 1P |
| IC1DU | | Q7 1S |
| IC1EP | | Q8 1F |
| IC1HJK | | Q9 5B |
| IC1JK | | Q10 6A |
| IC1KL | | Q11 5A |
| IC1M | | Q12 3J |
| IC1MN | | Q13 5U |
| IC1P | | Q14 4N |
| IC1S | | Q15 4N |
| IC1Y | | Q16 5P |
| IC2BL | | Q17 5W |
| IC2BU | | Q18 6W |
| IC2CL | | Q19 3V |
| IC2CU | | Q20 6N |
| IC2DL | | Q21 2V |
| IC2DU | | |
| IC2FB | | RB80 1P |
| IC2HJ | | RB204 3W |
| IC2KL | | RB205 1X |
| IC2LM | | RB206 1Z |
| IC2MN | | RB207 2E |
| IC2WP | | RB210 6U |
| IC2PR | | |
| IC3T | | RV1 1R |
| IC3B | | RV2 4A |
| IC3C | | RV3 1N |
| IC3D | | RV4 4N |
| IC3HJ | | RV6 6S |
| IC3KL | | RV8 6K |
| IC3LM | | RV9 6S |
| IC3MN | | RV10 5X |
| IC3PRL | | RV11 1A |
| IC3PRU | | RV12 1U |
| IC3V | | RV14 3V |
| IC3X | | RV15 1S |
| IC3Y | | RV16 5L |
| IC4BL | | |
| IC4BU | | S1 1A |
| IC4CL | | S2 5A |
| IC4CU | | S3 3Z |
| IC4DL | | S4 2A |
| IC4DU | | |
| IC4EFL | | TP1 3S |
| IC4EPU | | TP2 3S |
| IC4FH | | TP3 3R |
| IC4J | | TP4 2S |
| IC4K | | TP5 5E |
| IC4L | | TP6 1C |
| IC4M | | TP7 3K |
| IC4PL | | TP8 1K |
| IC4PU | | TP9 1J |
| IC4RL | | TP10 6K |
| IC4RU | | TP11 1C |
| IC4SL | | TP12 6M |
| IC4SU | | TP13 6J |
| IC4T | | TP14 6J |
| IC4U | | TP15 6B |
| IC4V | | TP16 6B |
| IC4W | | TP17 4A |
| IC4Y | | TP18 4L |
| IC5E | | TP19 4L |
| IC5F | | TP20 5A |
| IC5J | | TP21 1B |
| IC5K | | TP22 1L |
| IC5L | | TP23 5Y |
| IC5M | | TP24 5Y |
| IC5PU | | TP25 4P |
| IC5SL | | TP26 6X |
| IC5SU | | TP27 6R |
| IC5SL | | TP28 5P |
| IC5SU | | TP29 5P |
| IC5T | | TP30 1V |
| IC5U | | TP31 1V |
| IC5V | | TP32 1M |
| IC5X | | |
| IC5Z1 | | TPE1 1B |
| IC5Z2 | | TPE2 1P |
| IC6A | | TPE3 2M |
| IC6K | | TPE4 4A |
| IC6F | | TPE5 6M |
| IC6J | | TPE6 5Y |
| IC6K | | |
| | | VCO1 6C |

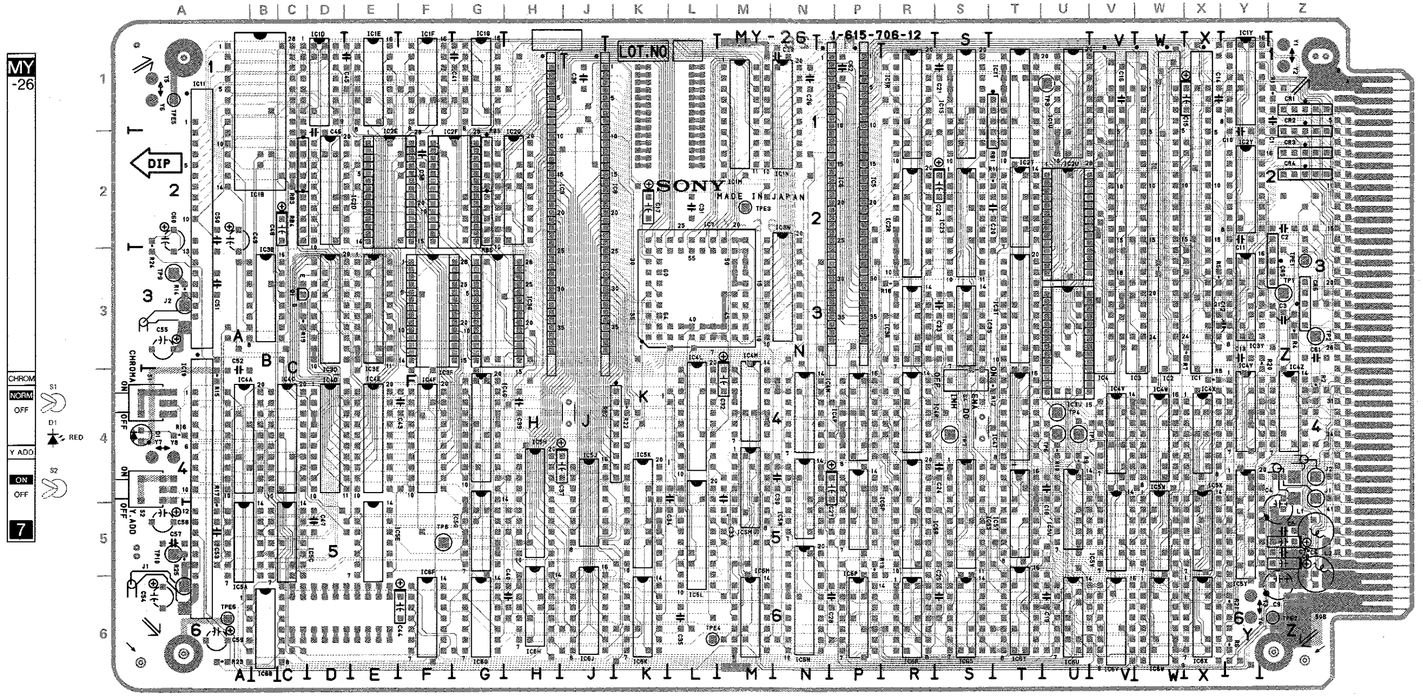
## MY-26 BOARD

16-Line Memory
Sequencer
Dropout Compensator
D/A Converter



## MY-26 BOARD (1-615-706-12)

Component Side



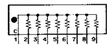

■ 1-615-706-12 COMPONENT SIDE

■ 1-615-706-12 SOLDER SIDE

**CR1, 2, 3, 4, 5, 6**

**RB1, 3, 4, 5, 6**

**RB2**



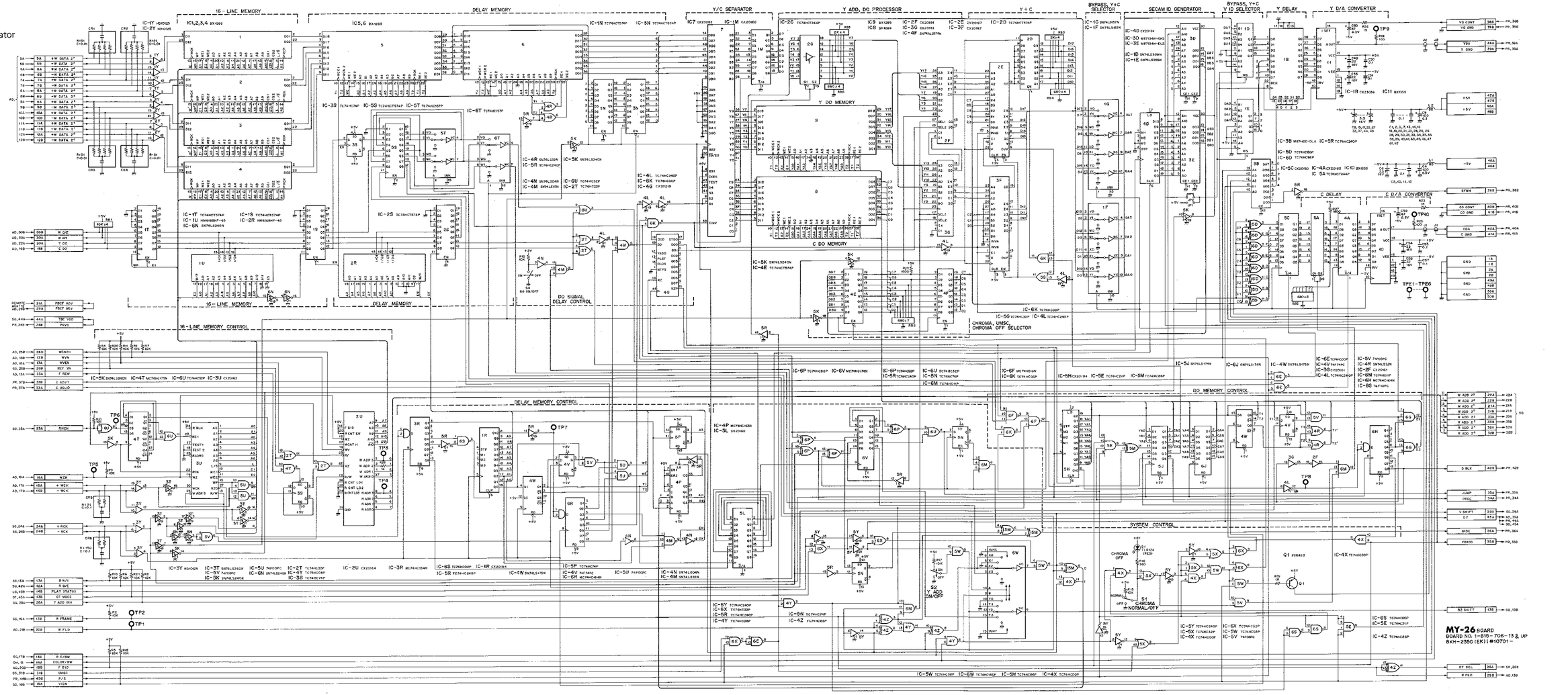
MY-26 (1-615-706-12,121)

BKM-2350(EK)

| | | | |
|---|---|---|---|
| CR1 | 1Z | IC4Y | |
| CR2 | 1Z | IC4Z | |
| CR3 | 2Z | IC5A | |
| CR4 | 2Z | IC5C | |
| CR5 | 3Z | IC5E | |
| CR6 | 3Z | IC5G | |
| | | IC5H | |
| D1 | 4A | IC5J | |
| | | IC5K | |
| IC1 | 2X | IC5L | |
| IC2 | 2W | IC5M | |
| IC3 | 2W | IC5N | |
| IC4 | 2V | IC5P | |
| IC5 | 2P | IC5R | |
| IC6 | 2N | IC5S | |
| IC7 | 3L | IC5T | |
| IC8 | 2J | IC5U | |
| IC9 | 2H | IC5V | |
| IC10 | 4A | IC5W | |
| IC11 | 3A | IC5X | |
| | | IC5Y | |
| IC1B | | IC6B | |
| IC1D | | IC6P | |
| IC1E | | IC6Q | |
| IC1F | | IC6R | |
| IC1G | | IC6J | |
| IC1K | | IC6K | |
| IC1N | | IC6M | |
| IC1R | | IC6N | |
| IC1S | | IC6P | |
| IC1T | | IC6R | |
| IC1U | | IC6S | |
| IC1Y | | IC6T | |
| IC2U | | IC6U | |
| IC2Z | | IC6V | |
| IC2F | | IC6W | |
| IC2G | | IC6X | |
| IC2R | | | |
| IC2S | | Q1 | 3C |
| IC2T | | | |
| IC2U | | RB1 | 1T |
| IC2Y | | RB2 | 4J |
| IC3B | | RB3 | 2C |
| IC3D | | RB4 | 2C |
| IC3R | | RB5 | 2G |
| IC3F | | RB6 | 2G |
| IC3G | | | |
| IC3N | | S1 | 4A |
| IC3P | | S2 | 4A |
| IC3S | | S4 | 4S |
| IC3V | | | |
| IC3U | | TP1 | 3Z |
| IC3Y | | TP2 | 3Z |
| IC4A | | TP3 | 1U |
| IC4C | | TP4 | 4U |
| IC4D | | TP5 | 4U |
| IC4R | | TP6 | 4U |
| IC4F | | TP7 | 4S |
| IC4G | | TP8 | 5F |
| IC4L | | TP9 | 3A |
| IC4M | | TP10 | 5A |
| IC4N | | | |
| IC4P | | TPE1 | 3Z |
| IC4R | | TPE2 | 6Z |
| IC4T | | TPE3 | 2M |
| IC4V | | TPE4 | 6L |
| IC4W | | TPE5 | 1A |
| IC4X | | TPE6 | 6A |

## MY-26 BOARD

16-Line Memory
Sequencer
Dropout Compensator
D/A Converter

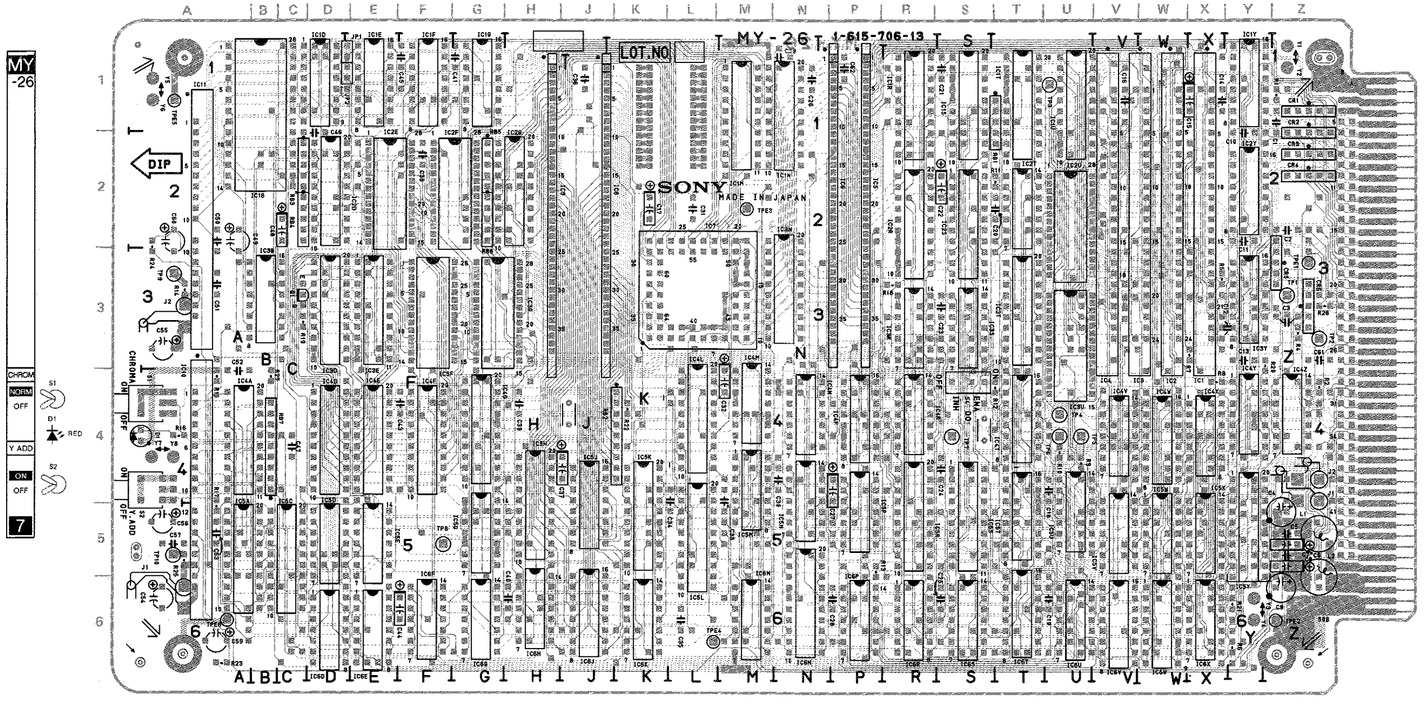



C-13 (5/7) C-13 (6/7) C-13 (7/7)

1-615-706-13 CARD RACK MY-26 MY-26 CARD RACK 1-615-706-13

## MY-26 BOARD (1-615-706-13)

Component Side



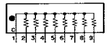

1-615-706-13 COMPONENT SIDE

1-615-706-13 SOLDER SIDE

**CR1, 2, 3, 4, 5, 6**

**RB1, 3, 4, 5, 6**

**RB2, 7**



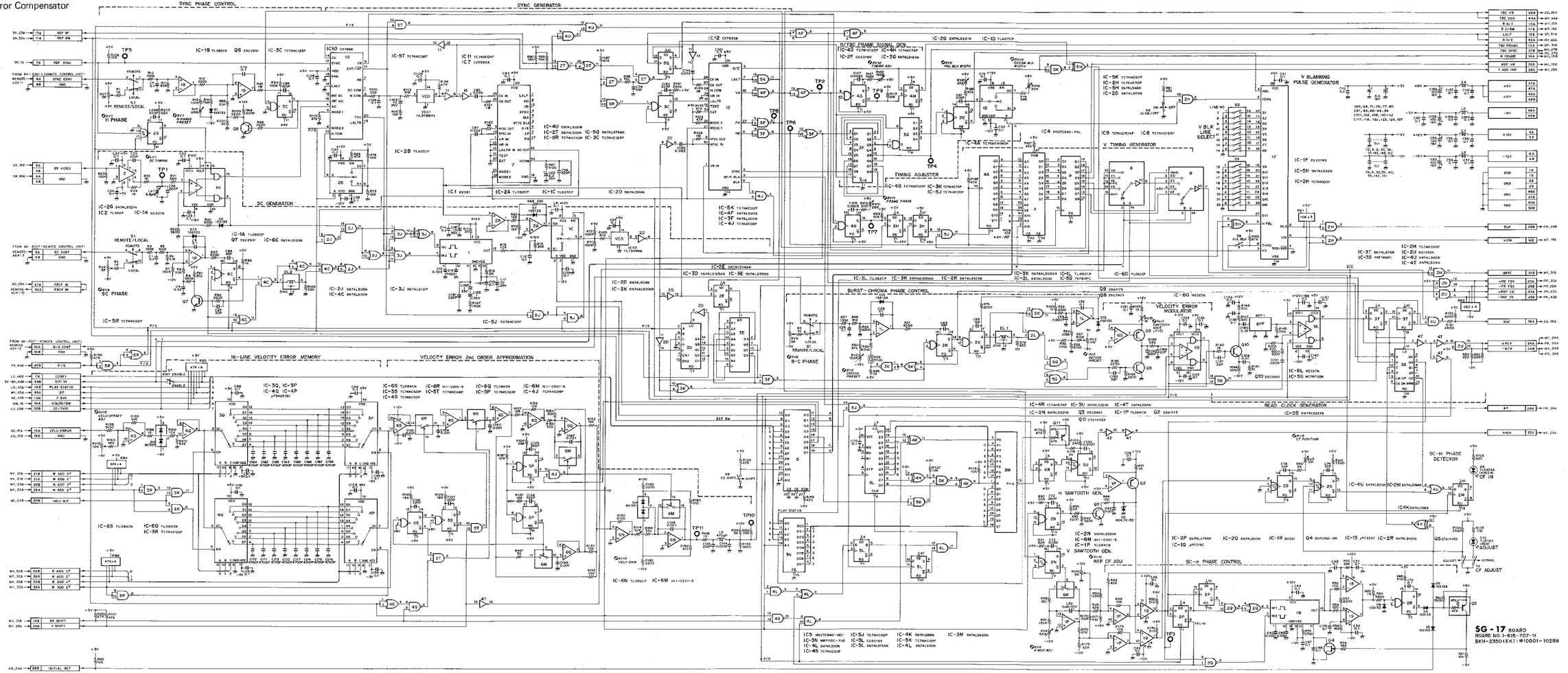
MY-26 (1-615-706-13 & UP)

BRH-2350(EK)

| | | |
|---|---|---|
| CR1 | 1E | IC5A |
| CR2 | 1E | IC5C |
| CR3 | 2E | IC5D |
| CR4 | 2E | IC5E |
| CR5 | 3E | IC5G |
| CR6 | 3E | IC5H |
| | | IC5J |
| D1 | 4A | IC5K |
| | | IC5L |
| IC1 | 2X | IC5M |
| IC2 | 2W | IC5N |
| IC3 | 2W | IC5P |
| IC4 | 2V | IC5R |
| IC5 | 2P | IC5S |
| IC6 | 2N | IC5T |
| IC7 | 3L | IC5U |
| IC8 | 2J | IC5V |
| IC9 | 2H | IC5W |
| IC10 | 4A | IC5X |
| IC11 | 2A | IC5Y |
| | | IC6D |
| IC1B | | IC6E |
| IC1D | | IC6F |
| IC1E | | IC6G |
| IC1F | | IC6H |
| IC1G | | IC6J |
| IC1H | | IC6K |
| IC1K | | IC6M |
| IC1L | | IC6N |
| IC1N | | IC6P |
| IC1P | | IC6R |
| IC1T | | IC6S |
| IC1U | | IC6T |
| IC1V | | IC6U |
| IC1W | | IC6V |
| IC1X | | IC6W |
| IC1Y | | IC6X |
| IC2B | | |
| IC2D | | |
| IC2F | | |
| IC2G | | |
| IC2H | | |
| IC2J | | JP1 1E |
| IC2T | | JP2 1E |
| IC2U | | |
| IC2V | | Q1 3C |
| IC3B | | |
| IC3D | | RB1 1T |
| IC3E | | RB2 4J |
| IC3F | | RB3 2C |
| IC3G | | RB4 2C |
| IC3H | | RB5 2G |
| IC3K | | RB6 2G |
| IC3L | | RB7 4B |
| IC3M | | |
| IC3N | | S1 4A |
| IC3P | | S2 4A |
| IC3R | | S4 4B |
| IC3S | | |
| IC3T | | TP1 3E |
| IC3U | | TP2 3E |
| IC3V | | TP3 1U |
| IC3W | | TP4 4U |
| IC3X | | TP5 4D |
| IC3Y | | TP6 4D |
| IC4A | | TP7 4S |
| IC4B | | TP8 5P |
| IC4C | | TP9 3A |
| IC4D | | TP10 5A |
| IC4E | | |
| IC4F | | TPB1 3E |
| IC4G | | TPB2 6E |
| IC4H | | TPB3 2M |
| IC4J | | TPB4 6L |
| IC4K | | TPB5 1A |
| IC4L | | TPB6 6A |
| IC4M | | |
| IC4N | | |
| IC4P | | |
| IC4R | | |
| IC4T | | |
| IC4V | | |
| IC4W | | |
| IC4X | | |
| IC4Y | | |
| IC4Z | | |

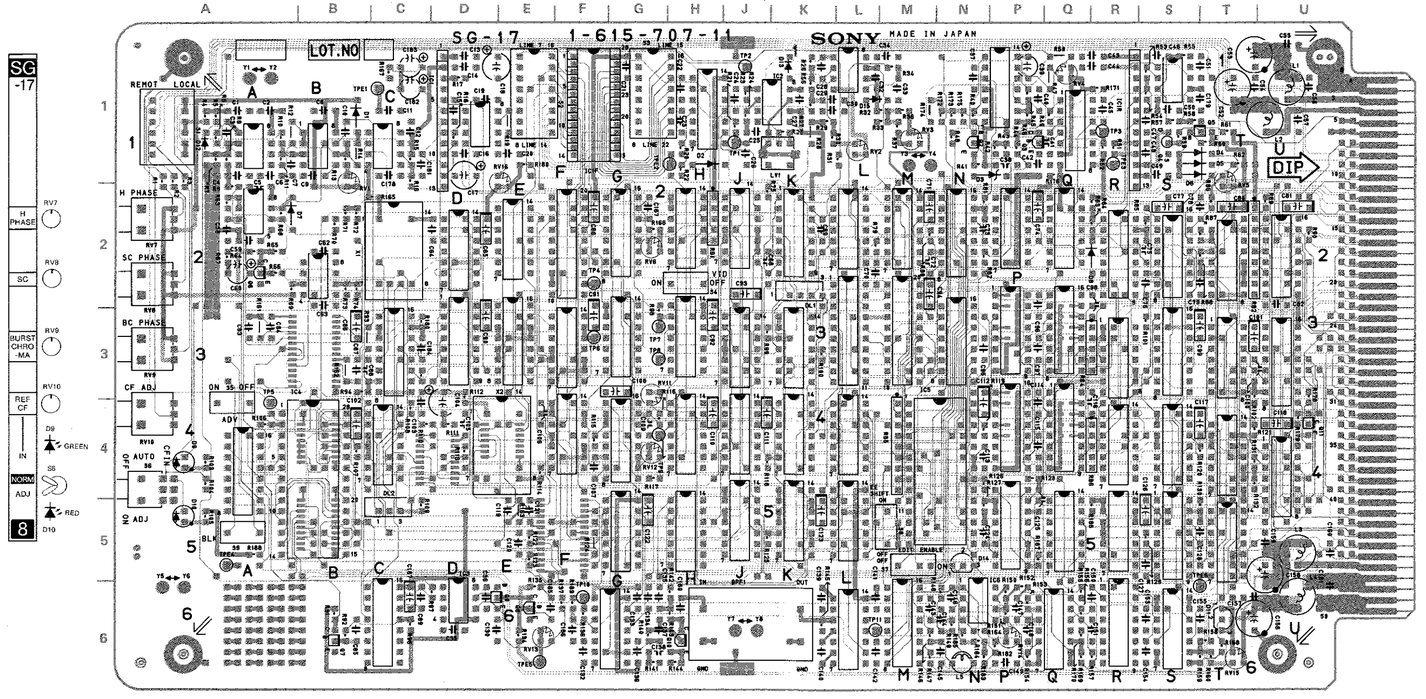
## SG-17 BOARD

Sync Generator
Read Clock Generator
Velocity Error Compensator



## SG-17 BOARD (1-615-707-11)

Component Side




■ 1-615-707-11 COMPONENT SIDE

■ 1-615-707-11 SOLDER SIDE

**RB1, 4, 6**

**RB2, 5**

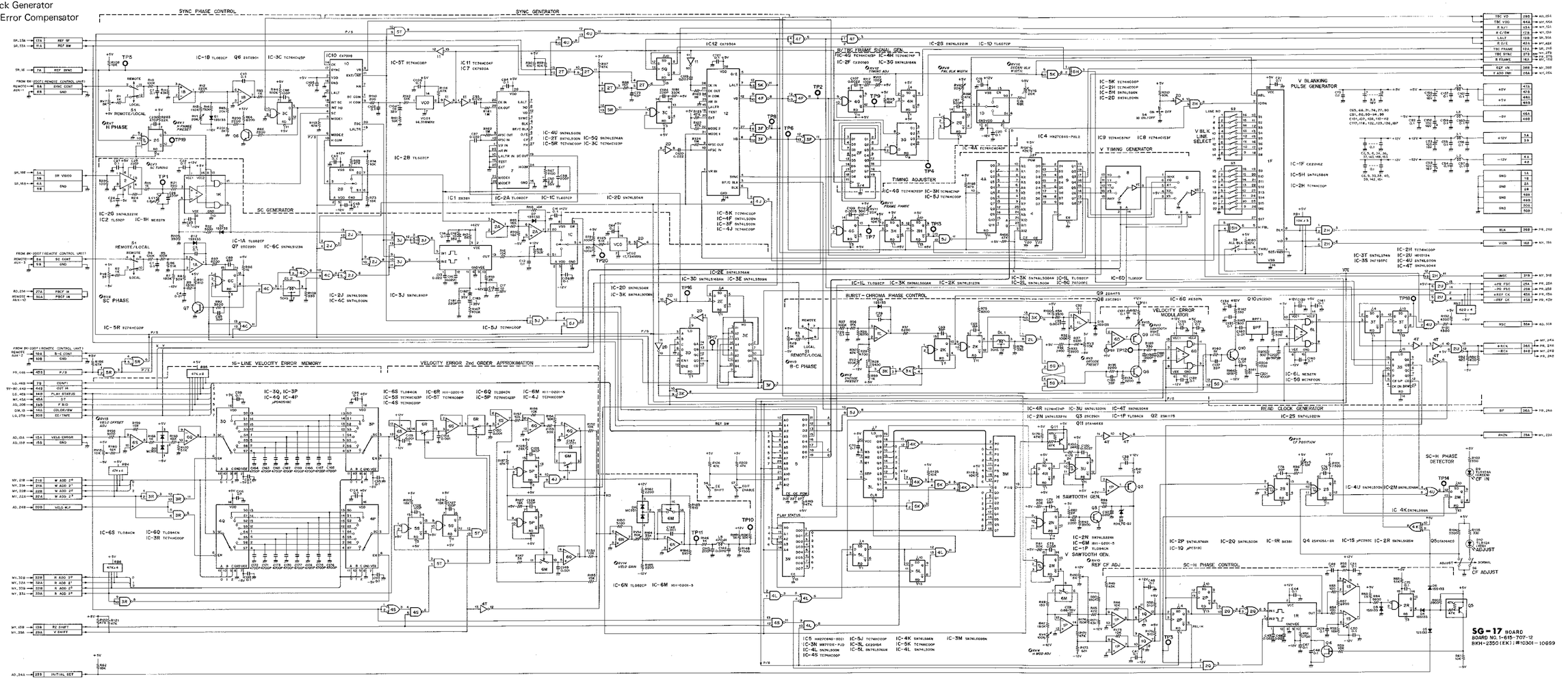
SG-17 (1-615-707-11)

BKH-2350(EK)

| | | | |
|---|---|---|---|
| BPF1 | 6J | IC4S | |
| | | IC4T | |
| D1 | 1B | IC4U | |
| D2 | 1B | IC5G | |
| D3 | 1P | IC5H | |
| D4 | 1S | IC5J | |
| D5 | 1S | IC5K | |
| D6 | 1S | IC5L | |
| D7 | 2A | IC5P | |
| D8 | 2R | IC5Q | |
| D9 | 4A | IC5R | |
| D10 | 5A | IC5S | |
| D11 | 5T | IC5T | |
| D12 | 1A | IC6C | |
| D13 | 1K | IC6D | |
| D14 | 5N | IC6G | |
| D15 | 1L | IC6L | |
| | | IC6M | |
| DL1 | 2K | IC6N | |
| DL2 | 5C | IC6Q | |
| | | IC6R | |
| | | IC6S | |
| IC1 | 1D | | |
| IC2 | 1K | | |
| IC4 | 4B | LV1 | 1K |
| IC5 | 4N | | |
| IC7 | 3B | Q2 | 1N |
| IC8 | 4B | Q3 | 1P |
| IC9 | 5B | Q4 | 1S |
| IC10 | 4D | Q5 | 1S |
| IC11 | 4E | Q6 | 2A |
| IC12 | 5F | Q7 | 6B |
| | | Q8 | 6E |
| IC1A | | Q9 | 6K |
| IC1B | | Q10 | 6N |
| IC1C | | Q11 | 4U |
| IC1D | | | |
| IC1F | | RB1 | 2H |
| IC1H | | RB2 | 2T |
| IC1L | | RB4 | 3R |
| IC1T | | RB5 | 4R |
| IC1Q | | RB6 | 4R |
| IC1R | | | |
| IC1S | | RV1 | 2B |
| IC2A | | RV2 | 1L |
| IC2B | | RV3 | 1M |
| IC2D | | RV4 | 1Q |
| IC2E | | RV5 | 2T |
| IC2F | | RV6 | 2G |
| IC2G | | RV7 | 2A |
| IC2H | | RV8 | 2A |
| IC2J | | RV9 | 3A |
| IC2K | | RV10 | 4A |
| IC2L | | RV11 | 3G |
| IC2M | | RV12 | 4G |
| IC2N | | RV13 | 6F |
| IC2P | | RV14 | 6P |
| IC2Q | | RV15 | 6T |
| IC2R | | RV16 | 2E |
| IC2S | | | |
| IC2T | | S1 | 1A |
| IC2U | | S2 | 1E |
| IC3C | | S3 | 1G |
| IC3D | | S4 | 2H |
| IC3E | | S6 | 4A |
| IC3F | | S7 | 5M |
| IC3G | | S8 | 5M |
| IC3H | | S9 | 5A |
| IC3J | | | |
| IC3K | | TP1 | 1J |
| IC3L | | TP2 | 1J |
| IC3M | | TP3 | 1R |
| IC3N | | TP4 | 2F |
| IC3P | | TP5 | 4A |
| IC3Q | | TP6 | 3F |
| IC3R | | TP7 | 3G |
| IC3S | | TP8 | 3G |
| IC3T | | TP9 | 4G |
| IC3U | | TP10 | 6P |
| IC4A | | TP11 | 6L |
| IC4C | | | |
| IC4F | | TPB1 | 1C |
| IC4G | | TPB2 | 1R |
| IC4H | | TPB3 | 1R |
| IC4J | | TPB4 | 5A |
| IC4K | | TPB5 | 6E |
| IC4L | | TPB6 | 6S |
| IC4M | | | |
| IC4P | | | |
| IC4Q | | X1 | 2C |
| IC4R | | X2 | 4D |

## SG-17 BOARD

Sync Generator
Read Clock Generator
Velocity Error Compensator

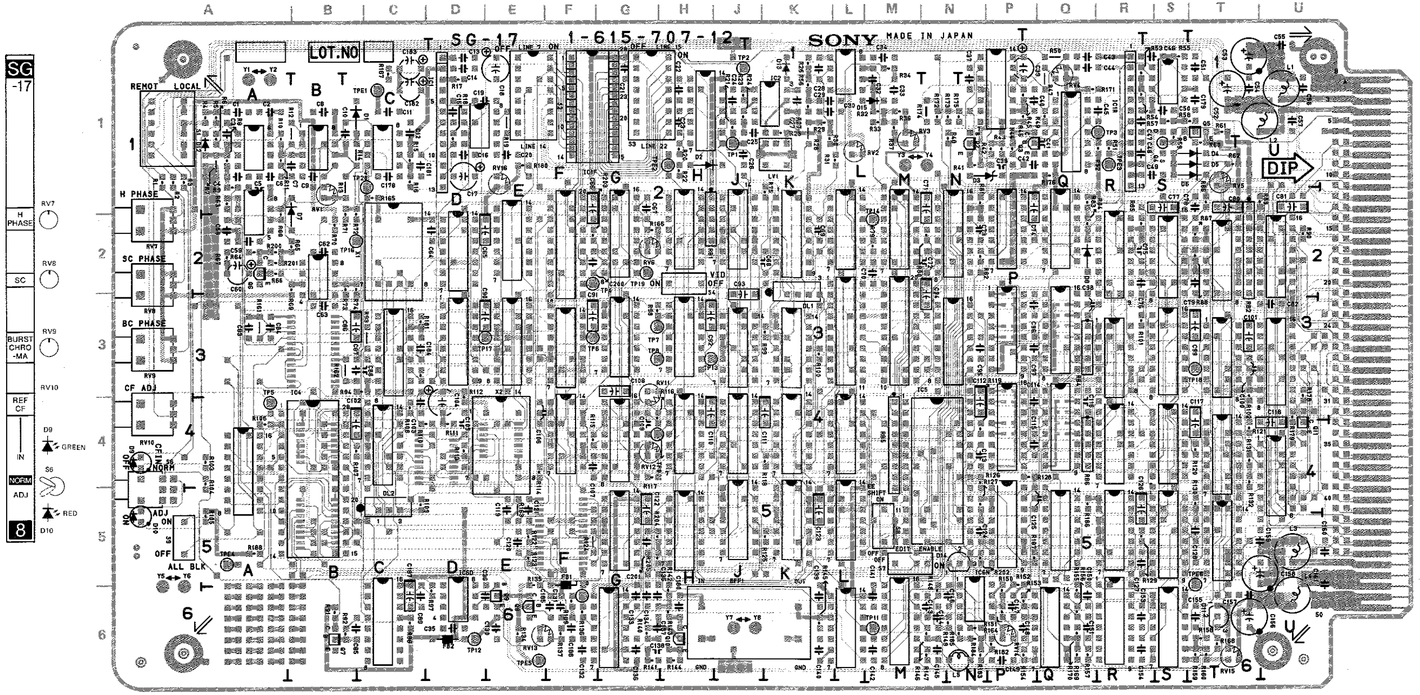



C-19 (5/13) C-19 (6/13) C-19 (7/13)

1-615-707-12 CARD RACK SG-17 SG-17 CARD RACK 1-615-707-12

## SG-17 BOARD (1-615-707-12)

Component Side




1-615-707-12 COMPONENT SIDE

1-615-707-12 SOLDER SIDE

**RB1, 4, 6**

**RB2, 5**

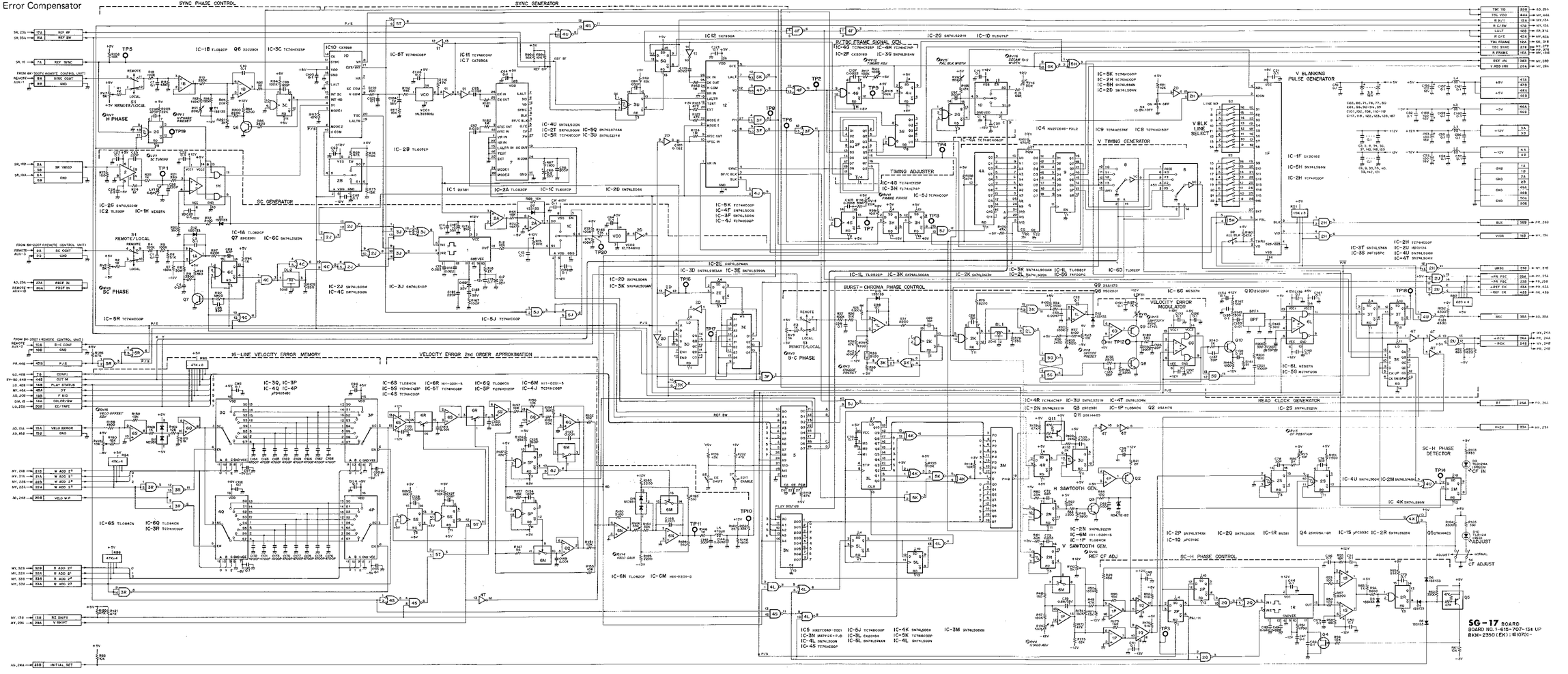
SG-17 (1-615-707-12)

BRB-2350(EK)

| | | | |
|---|---|---|---|
| BPF1 | 6J | IC5G | |
| | | IC5H | |
| B1 | 1B | IC5J | |
| B2 | 1D | IC5K | |
| B3 | 1F | IC5L | |
| D4 | 1T | IC5P | |
| D5 | 1T | IC5Q | |
| D6 | 1T | IC5R | |
| D7 | 2A | IC5S | |
| D8 | 2Q | IC5T | |
| D9 | 4A | IC6C | |
| D10 | 5A | IC6D | |
| D11 | 6T | IC6G | |
| D12 | 1A | IC6L | |
| D13 | 1K | IC6M | |
| D14 | 5N | IC6N | |
| D15 | 1M | IC6Q | |
| | | IC6R | |
| DL1 | 2K | IC6S | |
| DL2 | 5C | | |
| | | LV1 | 1K |
| IC1 | 1D | | |
| IC2 | 1K | Q2 | 1N |
| IC4 | 4B | Q3 | 1P |
| IC5 | 4N | Q4 | 1S |
| IC7 | 3B | Q5 | 1T |
| IC8 | 4B | Q6 | 2A |
| IC9 | 5B | Q7 | 6N |
| IC10 | 4D | Q8 | 6E |
| IC11 | 4E | Q9 | 6E |
| IC12 | 5F | Q10 | 6H |
| | | Q11 | 4U |
| IC1A | | | |
| IC1B | | RB1 | 2H |
| IC1C | | RB2 | 2T |
| IC1D | | RB4 | 3Q |
| IC1F | | RB5 | 4M |
| IC1H | | RB6 | 4Q |
| IC1L | | | |
| IC1P | | RV1 | 2B |
| IC1Q | | RV2 | 1L |
| IC1R | | RV3 | 1M |
| IC1S | | RV4 | 1Q |
| IC2A | | RV5 | 2T |
| IC2B | | RV6 | 2G |
| IC2D | | RV7 | 2A |
| IC2E | | RV8 | 2A |
| IC2F | | RV9 | 3A |
| IC2G | | RV10 | 4A |
| IC2H | | RV11 | 3G |
| IC2J | | RV12 | 4G |
| IC2K | | RV13 | 6S |
| IC2L | | RV14 | 6P |
| IC2M | | RV15 | 6T |
| IC2N | | RV16 | 1E |
| IC2P | | | |
| IC2Q | | S1 | 1A |
| IC2R | | S2 | 1E |
| IC2S | | S3 | 1G |
| IC2T | | S4 | 2H |
| IC2U | | S5 | 4A |
| IC3C | | S7 | 5M |
| IC3D | | S8 | 5M |
| IC3E | | S9 | 5A |
| IC3F | | | |
| IC3G | | TP1 | 1J |
| IC3H | | TP2 | 1J |
| IC3J | | TP3 | 1R |
| IC3K | | TP4 | 2F |
| IC3L | | TP5 | 4A |
| IC3M | | TP6 | 3F |
| IC3N | | TP7 | 3G |
| IC3P | | TP8 | 3G |
| IC3Q | | TP9 | 4G |
| IC3R | | TP10 | 6F |
| IC3S | | TP11 | 6M |
| IC3T | | TP12 | 6D |
| IC3U | | TP13 | 3M |
| IC4A | | TP14 | 2L |
| IC4C | | TP16 | 2B |
| IC4F | | TP17 | 6F |
| IC4G | | TP18 | 2T |
| IC4H | | TP19 | 2Q |
| IC4J | | TP20 | 1C |
| IC4K | | | |
| IC4L | | TPE1 | 1C |
| IC4P | | TPE2 | 1N |
| IC4Q | | TPE3 | 1R |
| IC4R | | TPE4 | 5A |
| IC4S | | TPE5 | 6R |
| IC4T | | TPE6 | 6T |
| IC4U | | | |
| | | X1 | 2C |
| | | X2 | 4E |

## SG-17 BOARD

Sync Generator
Read Clock Generator
Velocity Error Compensator




C-19 (11/13)

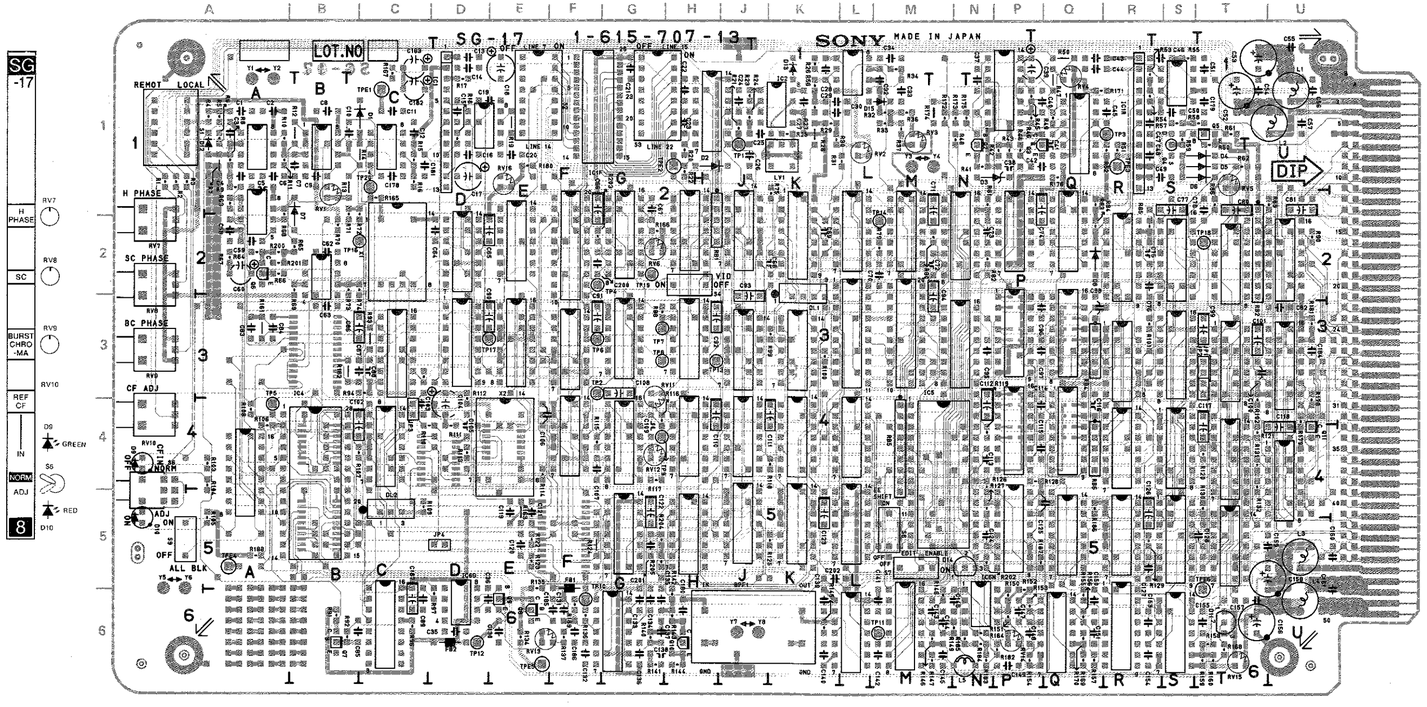
C-19 (12/13)

C-19 (13/13)

1-615-707-13 CARD RACK SG-17 SG-17 CARD RACK 1-615-707-13

## SG-17 BOARD (1-615-707-13)

Component Side

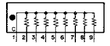



1-615-707-13 COMPONENT SIDE

1-615-707-13 SOLDER SIDE

**RB1, 4, 6**

**RB2, 5**



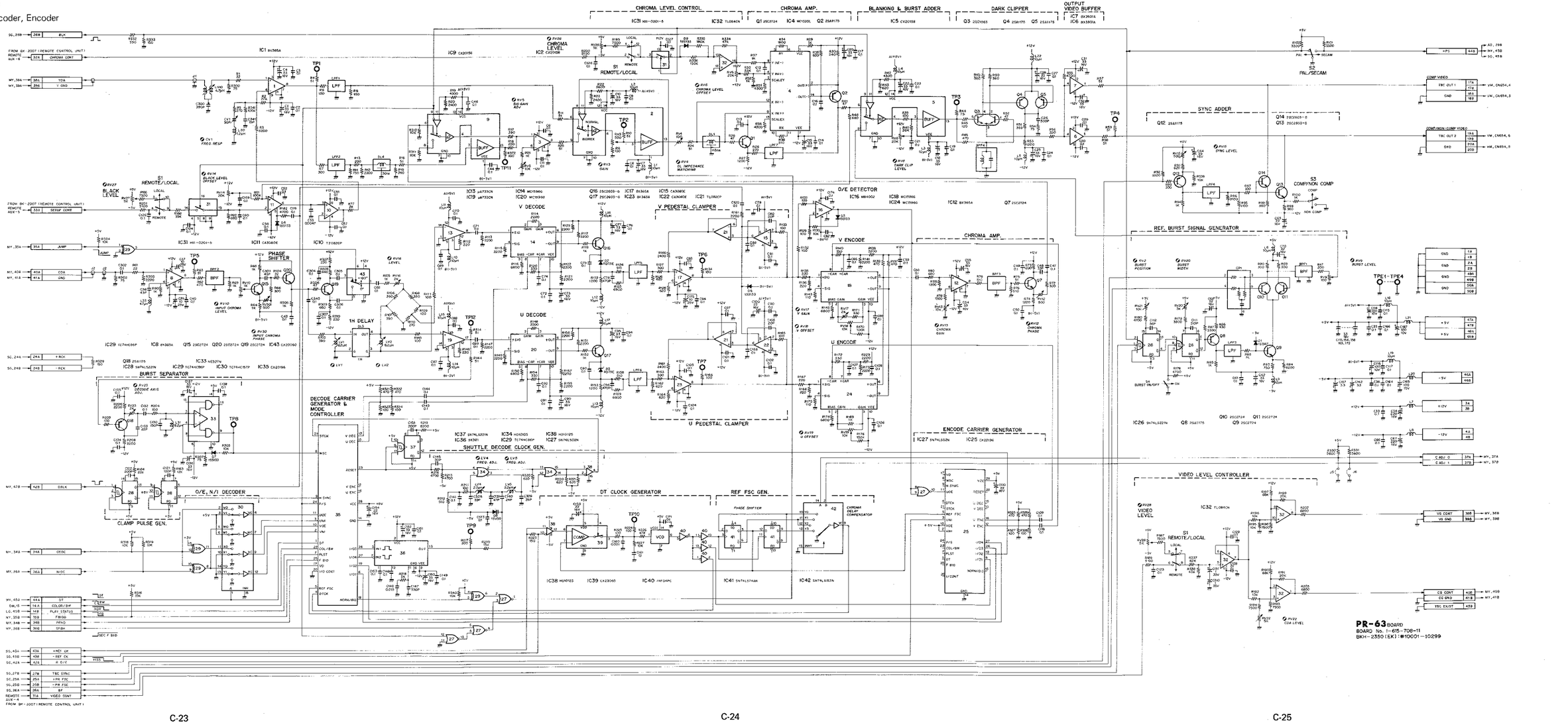
SG-17 (1-615-707-13 & UP)

BKH-2350(BK)

| | | | | | |
|---|---|---|---|---|---|
| BPF1 | 6J | IC5G | | | |
| | | IC5H | | | |
| D1 | 1B | IC5J | | | |
| D2 | 1B | IC5K | | | |
| D3 | 1P | IC5L | | | |
| D4 | 1T | IC5P | | | |
| D5 | 1T | IC5Q | | | |
| D6 | 1T | IC5R | | | |
| D7 | 2A | IC5S | | | |
| D8 | 2Q | IC5T | | | |
| D9 | 4A | IC6C | | | |
| D10 | 5A | IC6D | | | |
| D11 | 6T | IC6G | | | |
| D12 | 1A | IC6L | | | |
| D13 | 1K | IC6M | | | |
| D14 | 5N | IC6N | | | |
| D15 | 1M | IC6Q | | | |
| | | IC6R | | | |
| DL1 | 2K | IC6S | | | |
| DL2 | 5C | | | | |
| | | LV1 | 1K | | |
| IC1 | 1D | | | | |
| IC2 | 1K | Q2 | 1N | | |
| IC4 | 4B | Q3 | 1P | | |
| IC5 | 4N | Q4 | 1S | | |
| IC7 | 3B | Q5 | 1T | | |
| IC8 | 4B | Q6 | 2A | | |
| IC9 | 5B | Q7 | 6B | | |
| IC10 | 4D | Q8 | 6E | | |
| IC11 | 4E | Q9 | 6K | | |
| IC12 | 5F | Q10 | 6M | | |
| | | Q11 | 4U | | |
| IC1A | | RB1 | 2H | | |
| IC1B | | RB2 | 2T | | |
| IC1C | | RB4 | 3Q | | |
| IC1D | | RB5 | 4M | | |
| IC1F | | RB6 | 4Q | | |
| IC1H | | | | | |
| IC1L | | | | | |
| IC1P | | RV1 | 2B | | |
| IC1Q | | RV2 | 1L | | |
| IC1R | | RV3 | 1M | | |
| IC1S | | RV4 | 1Q | | |
| IC2A | | RV5 | 2C | | |
| IC2B | | RV6 | 2G | | |
| IC2D | | RV7 | 2A | | |
| IC2E | | RV8 | 2A | | |
| IC2F | | RV9 | 3A | | |
| IC2G | | RV10 | 4A | | |
| IC2H | | RV11 | 3G | | |
| IC2J | | RV12 | 4G | | |
| IC2K | | RV13 | 6E | | |
| IC2L | | RV14 | 6P | | |
| IC2M | | RV15 | 6T | | |
| IC2N | | RV16 | 1E | | |
| IC2P | | | | | |
| IC2Q | | S1 | 1A | | |
| IC2R | | S2 | 1E | | |
| IC2S | | S3 | 1G | | |
| IC2T | | S4 | 2H | | |
| IC2U | | S6 | 5A | | |
| IC3C | | S7 | 5M | | |
| IC3D | | S8 | 5M | | |
| IC3E | | S9 | 5A | | |
| IC3F | | | | | |
| IC3G | | TP1 | 1J | | |
| IC3H | | TP2 | 1J | | |
| IC3J | | TP3 | 1R | | |
| IC3K | | TP4 | 2F | | |
| IC3L | | TP5 | 4A | | |
| IC3M | | TP6 | 3F | | |
| IC3N | | TP7 | 3G | | |
| IC3P | | TP8 | 4G | | |
| IC3Q | | TP9 | 4G | | |
| IC3R | | TP10 | 6F | | |
| IC3S | | TP11 | 6M | | |
| IC3T | | TP12 | 6D | | |
| IC3U | | TP13 | 3R | | |
| IC4A | | TP14 | 2L | | |
| IC4C | | TP16 | 2B | | |
| IC4F | | TP17 | 6F | | |
| IC4G | | TP18 | 2T | | |
| IC4H | | TP19 | 2G | | |
| IC4J | | TP20 | 1C | | |
| IC4K | | | | | |
| IC4L | | TPE1 | 1C | | |
| IC4P | | TPE2 | 1H | | |
| IC4Q | | TPE3 | 1B | | |
| IC4R | | TPE4 | 5A | | |
| IC4S | | TPE5 | 6E | | |
| IC4T | | TPE6 | 6T | | |
| IC4U | | | | | |
| | | X1 | 2C | | |
| | | X2 | 4E | | |

## PR-63 BOARD

PAL U/V Decoder, Encoder Processor

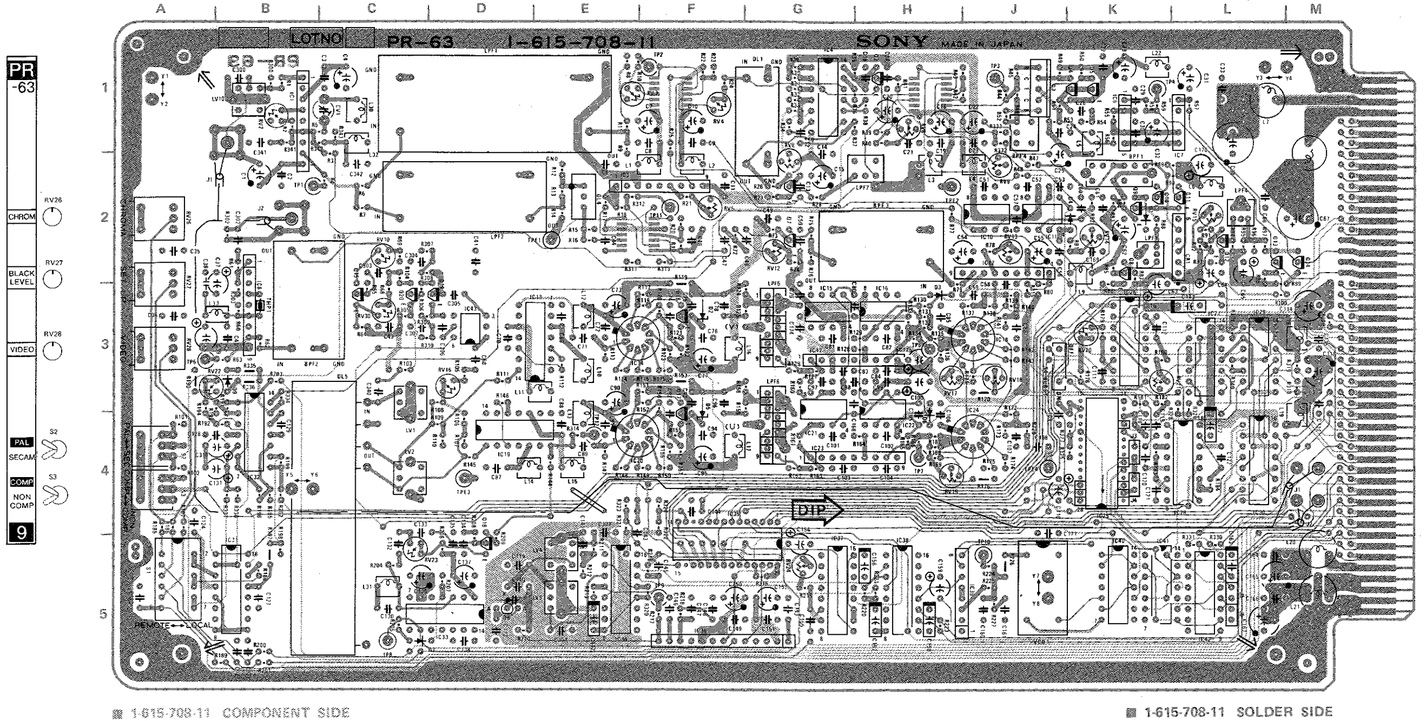



C-23 C-24 C-25

PR-63 CARD RACK 1-615-708-11

## PR-63 BOARD (1-615-708-11)

Component Side







■ 1-615-708-11 COMPONENT SIDE

■ 1-615-708-11 SOLDER SIDE

**CR1**

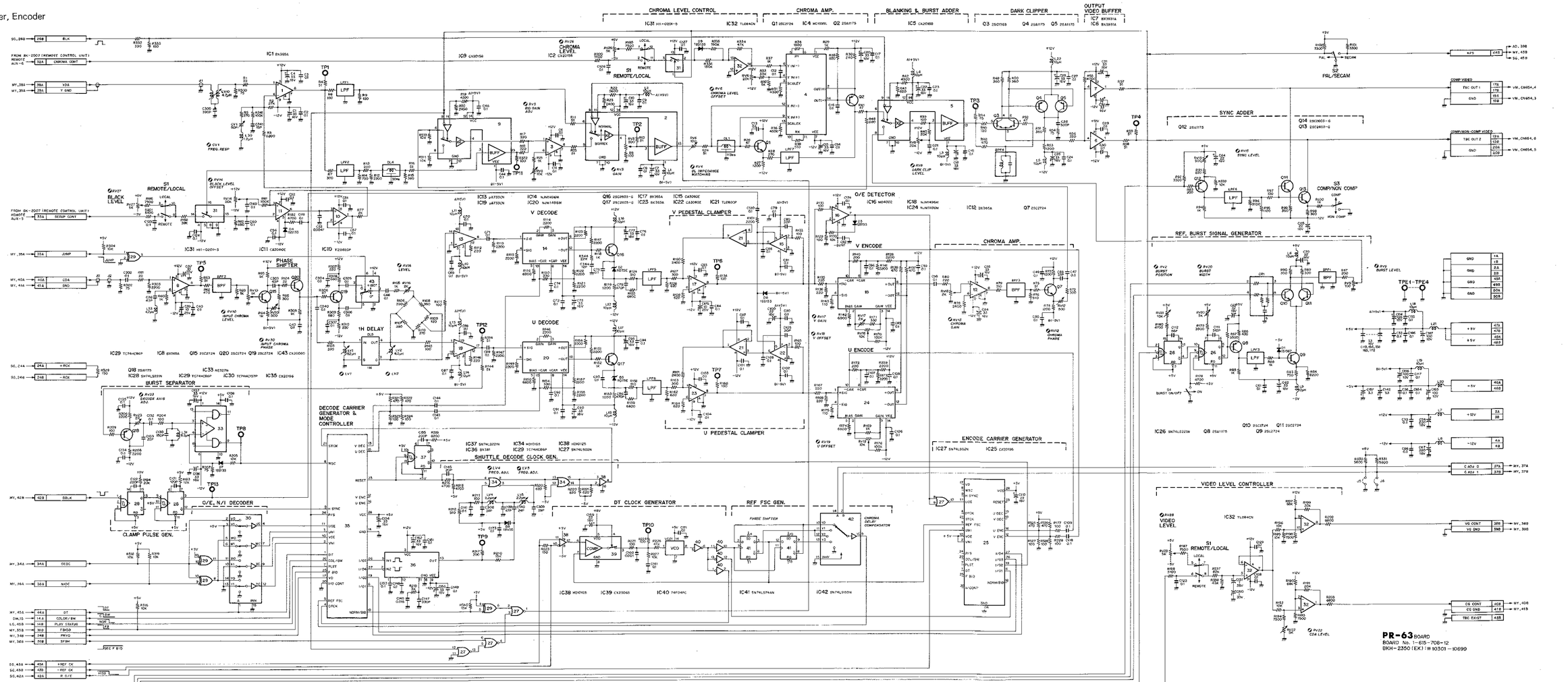
PR-63 (1-615-708-11)

BKH-2350(EK)

| | | | |
|---|---|---|---|
| BPF1 | 2K | LV1 | 3C |
| BPF2 | 3B | LV2 | 4C |
| BPF3 | 2H | LV4 | 5E |
| BPF4 | 1J | LV5 | 5B |
| | | LV10 | 1A |
| CR1 | 2L | | |
| | | Q1 | 2G |
| CV1 | 1C | Q2 | 1H |
| | | Q3 | 1J |
| D1 | 2K | Q4 | 1K |
| D2 | 3F | Q5 | 1K |
| D3 | 3H | Q7 | 2G |
| D4 | 2K | Q8 | 2K |
| D5 | 3F | Q9 | 2K |
| D6 | 3H | Q10 | 2K |
| D7 | 5C | Q11 | 2L |
| D8 | 5D | Q12 | 2L |
| D9 | 3B | Q13 | 2L |
| | | Q14 | 2M |
| DL1 | 1G | Q15 | 3C |
| DL4 | 2E | Q16 | 3F |
| DL5 | 4C | Q17 | 3F |
| | | Q18 | 3D |
| IC1 | 1B | Q19 | 3D |
| IC2 | 1F | Q20 | 3C |
| IC3 | 2F | | |
| IC4 | 1G | RV3 | 1E |
| IC5 | 1H | RV4 | 1F |
| IC6 | 1K | RV5 | 2F |
| IC7 | 1L | RV6 | 2G |
| IC8 | 3B | RV8 | 1H |
| IC9 | 2F | RV9 | 2J |
| IC10 | 2J | RV10 | 2C |
| IC11 | 2J | RV12 | 2G |
| IC12 | 2J | RV13 | 2J |
| IC13 | 2H | RV14 | 2K |
| IC14 | 3E | RV15 | 2L |
| IC15 | 3G | RV16 | 3D |
| IC16 | 3H | RV17 | 3H |
| IC17 | 3G | RV18 | 3J |
| IC18 | 3J | RV19 | 4H |
| IC19 | 4D | RV20 | 3K |
| IC20 | 4E | RV21 | 3K |
| IC21 | 3G | RV22 | 3A |
| IC22 | 3H | RV23 | 3C |
| IC23 | 4H | RV26 | 2A |
| IC24 | 4J | RV27 | 2A |
| IC25 | 4K | RV28 | 3A |
| IC26 | 3K | RV30 | 3C |
| IC27 | 3L | | |
| IC28 | 4L | S1 | 5A |
| IC29 | 1L | S2 | 4A |
| IC30 | 4L | S3 | 4A |
| IC31 | 5B | S4 | 3J |
| IC32 | 4B | | |
| IC33 | 5D | TP1 | 2B |
| IC34 | 5E | TP2 | 1F |
| IC35 | 5F | TP3 | 1J |
| IC36 | 5F | TP4 | 1K |
| IC37 | 5G | TP5 | 3A |
| IC38 | 5H | TP6 | 3H |
| IC39 | 5J | TP7 | 4H |
| IC40 | 5K | TP8 | 5C |
| IC41 | 5K | TP9 | 5F |
| IC42 | 5L | TP10 | 5J |
| IC43 | 3D | TP11 | 2F |
| | | TP12 | 4E |
| LPF1 | 1D | | |
| LPF2 | 2D | TPE1 | 2E |
| LPF3 | 2K | TPE2 | 2H |
| LPF4 | 2L | TPE3 | 4D |
| LPF5 | 3G | TPE4 | 4J |
| LPF6 | 3G | | |
| LPF7 | 2H | VCO1 | 5J |

## PR-63 BOARD

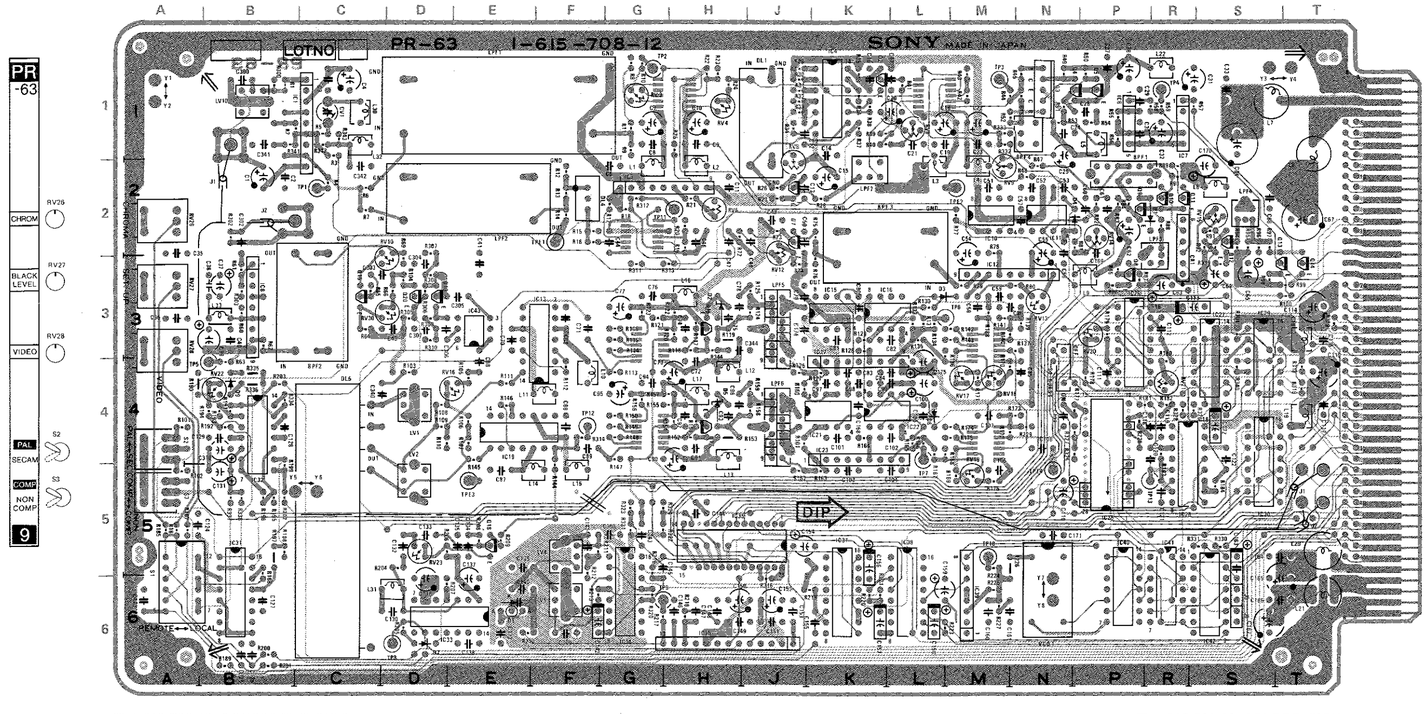
PAL U/V Decoder, Encoder
Processor




**PR-63** BOARD
BOARD No. 1-615-708-12
BKH-2350 (EK) : # 10301 – 10699

## PR-63 BOARD (1-615-708-12)

Component Side




■ 1-615-708-12 COMPONENT SIDE

■ 1-615-708-12 SOLDER SIDE

**CR1**

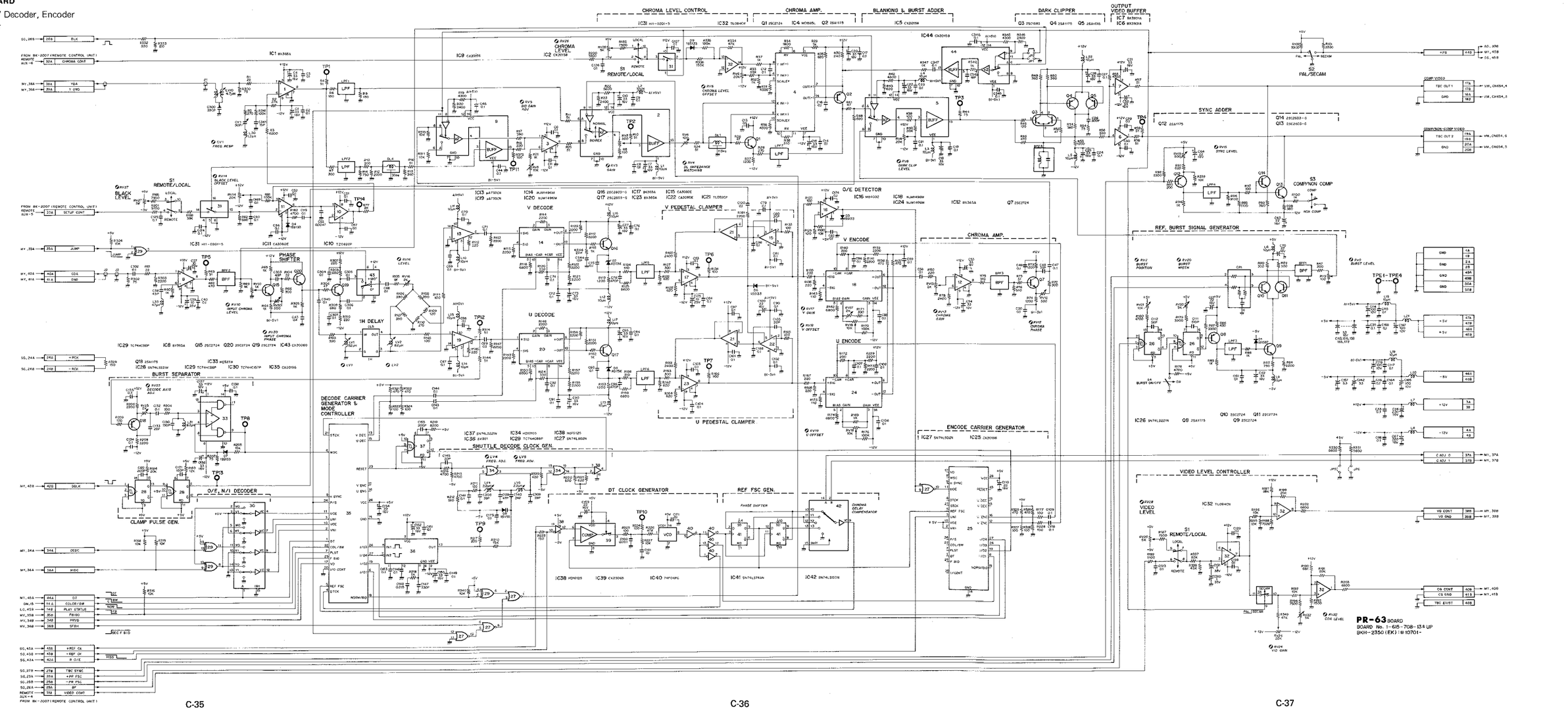
PR-63 (1-615-708-12)

BKH-2350(BK)

| | | | |
|---|---|---|---|
| BPF1 | 2P | LV1 | 4D |
| BPF2 | 3C | LV2 | 5D |
| BPF3 | 2K | LV4 | 5F |
| BPF4 | 2N | LV5 | 6F |
| | | LV10 | 1B |
| CR1 | 2R | | |
| | | Q1 | 2J |
| CV1 | 1C | Q2 | 1K |
| | | Q3 | 1N |
| D1 | 2R | Q4 | 1P |
| D2 | 3H | Q5 | 1F |
| D3 | 3L | Q7 | 2J |
| D4 | 2P | Q8 | 3P |
| D5 | 4H | Q9 | 2F |
| D6 | 4L | Q10 | 2R |
| D7 | 6D | Q11 | 2S |
| D8 | 6E | Q12 | 3S |
| D9 | 4B | Q13 | 3T |
| | | Q14 | 3T |
| DL1 | 1J | Q15 | 3C |
| DL4 | 2F | Q16 | 3H |
| DL5 | 5C | Q17 | 4H |
| | | Q18 | 5E |
| IC1 | 1C | Q19 | 3D |
| IC2 | 1H | Q20 | 3D |
| IC3 | 2G | | |
| IC4 | 1K | RV3 | 1G |
| IC5 | 1L | RV4 | 1H |
| IC6 | 1P | RV5 | 2H |
| IC7 | 1R | RV6 | 2J |
| IC8 | 3B | RV8 | 1L |
| IC9 | 2G | RV9 | 2M |
| IC10 | 2M | RV10 | 3D |
| IC11 | 2N | RV12 | 3J |
| IC12 | 2M | RV13 | 3N |
| IC13 | 2G | RV14 | 2P |
| IC14 | 3G | RV15 | 2S |
| IC15 | 3K | RV16 | 4E |
| IC16 | 3K | RV17 | 4M |
| IC17 | 4K | RV18 | 4M |
| IC18 | 3M | RV19 | 5M |
| IC19 | 4B | RV20 | 3P |
| IC20 | 4G | RV21 | 4R |
| IC21 | 4K | RV22 | 4B |
| IC22 | 4K | RV23 | 5D |
| IC23 | 4K | RV26 | 5A |
| IC24 | 4M | RV27 | 3A |
| IC25 | 4P | RV28 | 3A |
| IC26 | 3P | RV30 | 3D |
| IC27 | 3R | | |
| IC28 | 5R | S1 | 6A |
| IC29 | 3S | S2 | 4A |
| IC30 | 5S | S3 | 5A |
| IC31 | 6B | S4 | 4N |
| IC32 | 4B | | |
| IC33 | 6B | TP1 | 2C |
| IC34 | 6G | TP2 | 1G |
| IC35 | 5H | TP3 | 1N |
| IC36 | 6H | TP4 | 1R |
| IC37 | 6K | TP5 | 4B |
| IC38 | 6L | TP6 | 3M |
| IC39 | 6M | TP7 | 4L |
| IC40 | 6P | TP8 | 6D |
| IC41 | 6R | TP9 | 6G |
| IC42 | 6S | TP10 | 5M |
| IC43 | 3E | TP11 | 2H |
| | | TP12 | 4P |
| LPF1 | 1E | TP13 | 5K |
| LPF2 | 2E | | |
| LPF3 | 3E | TPE1 | 2F |
| LPF4 | 2S | TPE2 | 2M |
| LPF5 | 3J | TPE3 | 5E |
| LPF6 | 4J | TPE4 | 5N |
| LPF7 | 2K | | |
| | | VCO1 | 6N |

## PR-63 BOARD

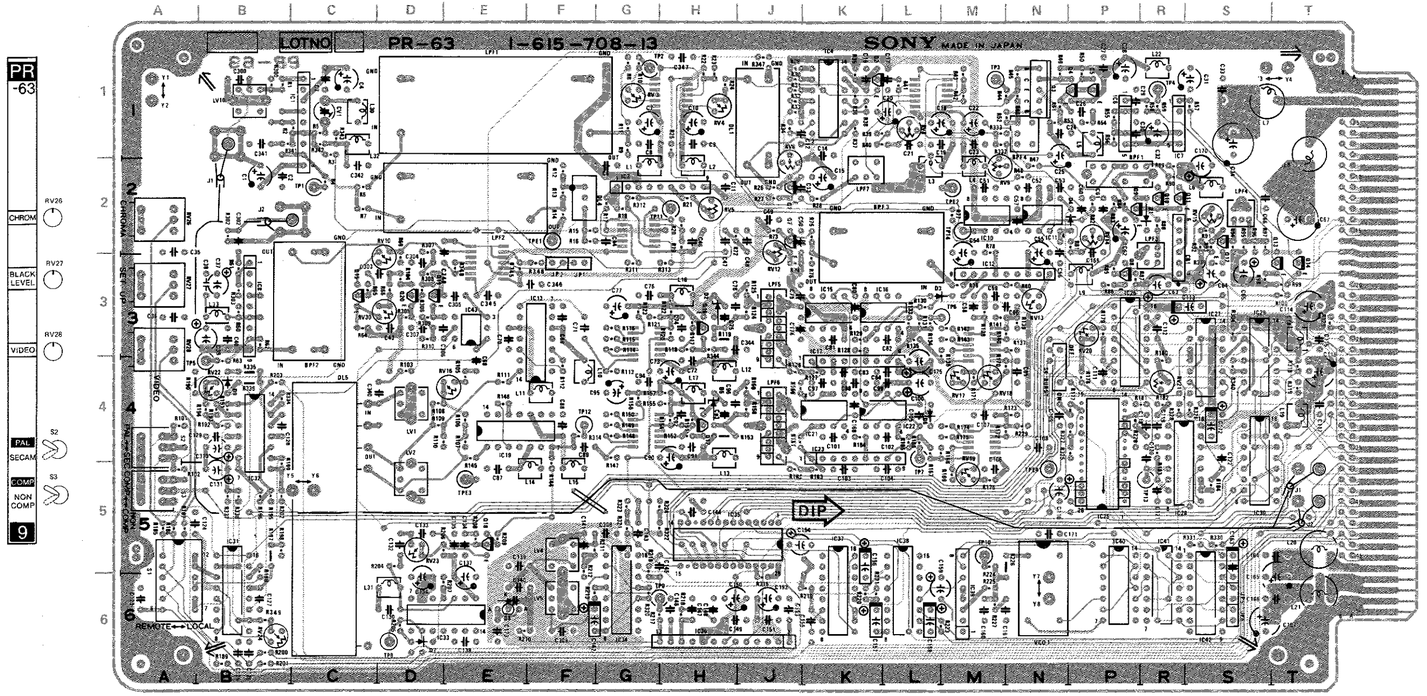
PAL U/V Decoder, Encoder
Processor




C-35 C-36 C-37

## PR-63 BOARD (1-615-708-13)

Component Side




1-615-708-13 COMPONENT SIDE

1-615-708-13 SOLDER SIDE

**CR1**

PR-63 (1-615-708-13 & JP2)

BKH-2350(EK)

| | | | |
|---|---|---|---|
| BPF1 | 2F | LV1 | 4D |
| BPF2 | 3C | LV2 | 5D |
| BPF3 | 2K | LV4 | 5F |
| BPF4 | 1N | LV5 | 6F |
| | | LV10 | 1B |
| CR1 | 2R | | |
| | | Q1 | 2J |
| CV1 | 1C | Q2 | 1K |
| | | Q3 | 1N |
| D1 | 2R | Q4 | 1P |
| D2 | 3H | Q5 | 1P |
| D3 | 3L | Q7 | 2J |
| D4 | 2P | Q8 | 3P |
| D5 | 4R | Q9 | 2P |
| D6 | 4L | Q10 | 2R |
| D7 | 6D | Q11 | 2R |
| D8 | 6S | Q12 | 2S |
| D9 | 4B | Q13 | 3T |
| | | Q14 | 3T |
| DL1 | 1J | Q15 | 3C |
| DL4 | 2F | Q16 | 3H |
| DL5 | 5C | Q17 | 4H |
| | | Q18 | 5E |
| IC1 | 1C | Q19 | 3D |
| IC2 | 1E | Q20 | 3D |
| IC3 | 2G | | |
| IC4 | 1K | RV3 | 1G |
| IC5 | 1L | RV4 | 1H |
| IC6 | 1P | RV5 | 2H |
| IC7 | 1R | RV6 | 2J |
| IC8 | 3S | RV8 | 1L |
| IC9 | 2G | RV9 | 2M |
| IC10 | 2H | RV10 | 3D |
| IC11 | 2N | RV12 | 3J |
| IC12 | 2M | RV13 | 3H |
| IC13 | 2S | RV14 | 2F |
| IC14 | 3G | RV15 | 2S |
| IC15 | 3K | RV16 | 4S |
| IC16 | 3K | RV17 | 4M |
| IC17 | 4K | RV18 | 4M |
| IC18 | 3M | RV19 | 5M |
| IC19 | 4E | RV20 | 3P |
| IC20 | 4G | RV21 | 4R |
| IC21 | 4K | RV22 | 4B |
| IC22 | 4K | RV23 | 5D |
| IC23 | 4K | RV24 | 6B |
| IC24 | 4M | RV26 | 2A |
| IC25 | 4P | RV27 | 3A |
| IC26 | 3P | RV28 | 3A |
| IC27 | 3E | RV30 | 3D |
| IC28 | 5R | | |
| IC29 | 3S | S1 | 6A |
| IC30 | 5S | S2 | 4A |
| IC31 | 6B | S3 | 5A |
| IC32 | 4B | S4 | 4N |
| IC33 | 6S | | |
| IC34 | 6G | TP1 | 2C |
| IC35 | 5R | TP2 | 1G |
| IC36 | 6H | TP3 | 1M |
| IC37 | 6K | TP4 | 1R |
| IC38 | 6L | TP5 | 4B |
| IC39 | 6N | TP6 | 3M |
| IC40 | 6P | TP7 | 4L |
| IC41 | 6R | TP8 | 6D |
| IC42 | 6S | TP9 | 6Q |
| IC43 | 3E | TP10 | 5M |
| | | TP11 | 2N |
| JP1 | 3F | TP12 | 4F |
| JP2 | 3P | TP13 | 5R |
| JP5 | 6S | TP14 | 2N |
| JP6 | 6S | | |
| | | TP81 | 2F |
| LPF1 | 1E | TP82 | 2M |
| LPF2 | 2E | TP83 | 5E |
| LPF3 | 3E | TP84 | 5N |
| LPF4 | 2S | | |
| LPF5 | 5J | VCO1 | 6N |
| LPF6 | 4J | | |
| LPF7 | 2K | | |

# SECTION D
# REPLACEABLE PARTS

## Notes on Repair Parts

(1) **Standardization of Parts**
Repair parts supplied from Sony Parts Center may not be always identical with the part which actually in use due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".
This manual's exploded views and electrical spare parts list are indicating the parts numbers of "the standardized genuine parts at present".

(2) Regarding engineering parts changes in our engineering department, refer to SECTION E CHANGED PARTS.

(3) **Stock of Parts**
Parts marked with ( ) on the spare parts list are not normally required for routine service work. Orders for parts marked with ( ) will be processed, but allow for additional delivery time.

(4) **Units for Capacitors, Inductors and Resistors**
The following units are assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified:

| | |
|---|---|
| Capacitors: | μF |
| Inductors: | μH |
| Resistors: | ohm |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| AD-22 BOARD (BKH-2350/CARD RACK) | | |
| 1pc | () A-6257-143-A | COMPLETE PCB,AD-22 |
| (This assembly includes the following parts.) | | |
| 1pc | () X-3673-641-0 | PLATE ASSY,SHIELD |
| C210 | 1-102-112-00 | CAP,CERAMIC 330PF 10% 50V |
| C63,83 | 1-107-079-00 | CAP,MICA 56PF 5% 50V |
| C28,44,108,121 | 1-107-080-00 | CAP,MICA 62PF 5% 50V |
| C200 | 1-107-083-00 | CAP,MICA 82PF 5% 50V |
| C131 | 1-107-157-00 | CAP,MICA 27PF 5% 500V |
| C22,29,57,72,94 | 1-107-158-00 | CAP,MICA 30PF 5% 500V |
| C27 | 1-107-210-00 | CAP,MICA 22PF 5% 500V |
| C30,36,42,71,95,106, 120,205 | 1-109-535-00 | CAP,MICA 100PF 5% 100V |
| C43 | 1-109-538-00 | CAP,MICA 130PF 5% 100V |
| C41,130 | 1-109-539-00 | CAP,MICA 150PF 5% 100V |
| c46,107,144 | 1-109-541-00 | CAP,MICA 200PF 5% 100V |
| C61,64,65,68,69,81,134, 139,140,142,143,146, 152 | 1-123-306-00 | CAP,ELECT 47 20% 10V |
| C8,9,10 | 1-123-307-00 | CAP,ELECT 100 20% 10V |
| C47,48,84,85,87,88,98, 99,103,104 | 1-123-318-00 | CAP,ELECT 33 20% 16V |
| C6,7 | 1-123-332-00 | CAP,ELECT 47 20% 16V |
| C11,15,20,21,26,31,51, 56,62,82,97,102,109, 119,137,209 | 1-130-471-00 | CAP,MYLAR 0.001 5% 50V |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (AD-22 BOARD,BKH-2350/CARD RACK) | | |
| C113,213 | 1-130-475-00 | CAP,MYLAR 0.0022 5% 50V |
| C77,96,129 | 1-130-477-00 | CAP,MYLAR 0.0033 5% 50V |
| C112 | 1-130-479-00 | CAP,MYLAR 0.0047 5% 50V |
| C135 | 1-130-480-00 | CAP,MYLAR 0.0056 5% 50V |
| C86,110,111,138,215 | 1-130-483-00 | CAP,MYLAR 0.01 5% 50V |
| C203 | 1-130-485-00 | CAP,MYLAR 0.015 5% 50V |
| C78,141 | 1-130-487-00 | CAP,MYLAR 0.022 5% 50V |
| C116,117 | 1-130-491-00 | CAP,MYLAR 0.047 5% 50V |
| C91,208 | 1-131-346-00 | CAP,TANT 0.68 10% 35V |
| C35,52,53,92,93 | 1-131-347-00 | CAP,TANT 1 10% 35V |
| C19,212 | 1-131-348-00 | CAP,TANT 1.5 10% 35V |
| C24 | 1-131-359-00 | CAP,TANT 10 10% 25V |
| C79,151 | 1-131-395-00 | CAP,TANT 100 10% 3.15V |
| C1,2,3,4,5,12,13,14,16, 17,18,23,33,34,37,38, 39,40,49,50,58,59,60, 66,73,74,75,76,80,89, 90,100,101,114,115,118, 122,123,124,125,126, 127,128,132,133,136, 145,147,148,149,150, 153,154,155,156,157, 158,159,160,161,162, 163,164,165,166,167, 168,169,170,171,172, 173,174,175,176,177, 201,206,207,211,214 | 1-161-894-00 | CAP,CERAMIC 0.1MF +80/-20% 50V |
| R180 | 1-214-517-00 | RES,METAL 22 1% 1/8W |
| R183 | 1-214-526-00 | RES,METAL 51 1% 1/8W |
| R9,75,87,91,105,125,128, 179,186,196,315 | 1-214-533-00 | RES,METAL 100 1% 1/8W |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (AD-22 BOARD,BKH-2350/CARD RACK) | | |
| R131,195 | 1-214-540-00 | RES,METAL 200 1% 1/8W |
| R84 | 1-214-541-00 | RES,METAL 220 1% 1/8W |
| R85 | 1-214-542-00 | RES,METAL 240 1% 1/8W |
| R86,90,135,193,302 | 1-214-544-00 | RES,METAL 300 1% 1/8W |
| R140,170,314 | 1-214-545-00 | RES,METAL 330 1% 1/8W |
| R199 | 1-214-546-00 | RES,METAL 360 1% 1/8W |
| R42,45,49,55 | 1-214-548-00 | RES,METAL 430 1% 1/8W |
| R109,111,200 | 1-214-550-00 | RES,METAL 510 1% 1/8W |
| R202 | 1-214-552-00 | RES,METAL 620 1% 1/8W |
| R77,97,107,108,307 | 1-214-553-00 | RES,METAL 680 1% 1/8W |
| R1,17,147,153,165,173, 177,178,187,188,316 | 1-214-557-00 | RES,METAL 1K 1% 1/8W |
| R89 | 1-214-560-00 | RES,METAL 1.3K 1% 1/8W |
| R88,327 | 1-214-561-00 | RES,METAL 1.5K 1% 1/8W |
| R184,323 | 1-214-562-00 | RES,METAL 1.6K 1% 1/8W |
| R185 | 1-214-563-00 | RES,METAL 1.8K 1% 1/8W |
| R70,93,156,176,201 | 1-214-564-00 | RES,METAL 2K 1% 1/8W |
| R6,28,81,92,142,144,145, 148,152,163,169,175, 190,209,306,311,320, 321 | 1-214-565-00 | RES,METAL 2.2K 1% 1/8W |
| R100 | 1-214-566-00 | RES,METAL 2.4K 1% 1/8W |
| R154,155 | 1-214-567-00 | RES,METAL 2.7K 1% 1/8W |
| R16 | 1-214-568-00 | RES,METAL 3K 1% 1/8W |
| R98,158,181 | 1-214-569-00 | RES,METAL 3.3K 1% 1/8W |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (AD-22 BOARD,BKH-2350/CARD RACK) | | |
| R5,7,112 | 1-214-571-00 | RES,METAL 3.9K 1% 1/8W |
| R39,83,319 | 1-214-572-00 | RES,METAL 4.3K 1% 1/8W |
| R13,168 | 1-214-574-00 | RES,METAL 5.1K 1% 1/8W |
| R43,54 | 1-214-575-00 | RES,METAL 5.6K 1% 1/8W |
| R30,56,326 | 1-214-576-00 | RES,METAL 6.2K 1% 1/8W |
| R182 | 1-214-577-00 | RES,METAL 6.8K 1% 1/8W |
| R106,124 | 1-214-578-00 | RES,METAL 7.5K 1% 1/8W |
| R10,23,63,126 | 1-214-579-00 | RES,METAL 8.2K 1% 1/8W |
| R4,8,14,21,27,32,36,48, 53,58,59,60,69,73,94, 99,117,122,129,132,133, 134,161,164,167,189, 198,208,310,312,313, 328 | 1-214-581-00 | RES,METAL 10K 1% 1/8W |
| R157,159,167 | 1-214-582-00 | RES,METAL 11K 1% 1/8W |
| R31,57,317,318 | 1-214-583-00 | RES,METAL 12K 1% 1/8W |
| R20,64,67,68,96,119, 149 | 1-214-585-00 | RES,METAL 15K 1% 1/8W |
| R31,62,197 | 1-214-587-00 | RES,METAL 18K 1% 1/8W |
| R18,24,35,71,76,116, 138,149,325 | 1-214-588-00 | RES,METAL 20K 1% 1/8W |
| R2,38,113,115,166,300, 301 | 1-214-589-00 | RES,METAL 22K 1% 1/8W |
| R47,52,160 | 1-214-590-00 | RES,METAL 24K 1% 1/8W |
| R27 | 1-214-591-00 | RES,METAL 27K 1% 1/8W |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (AD-22 BOARD,BKH-2350/CARD RACK) | | |
| R34,123 | 1-214-592-00 | RES,METAL 30K 1% 1/8W |
| R11,22,26,33,74,104, 120,121,127,130,137, 203 | 1-214-593-00 | RES,METAL 33K 1% 1/8W |
| R141 | 1-215-481-00 | RES,METAL 330K 1% 1/6W |
| R15 | 1-215-483-00 | RES,METAL 390K 1% 1/6W |
| R171 | 1-215-820-11 | RES,METAL 39K 1% 1/8W |
| R61,162 | 1-215-822-11 | RES,METAL 47K 1% 1/8W |
| R19,110 | 1-215-823-11 | RES,METAL 51K 1% 1/8W |
| R136 | 1-215-824-11 | RES,METAL 56K 1% 1/8W |
| R72,146 | 1-215-827-11 | RES,METAL 75K 1% 1/8W |
| R12 | 1-215-828-11 | RES,METAL 82K 1% 1/8W |
| R3,46,51,118,139,143, 172,305,309,324 | 1-215-830-11 | RES,METAL 100K 1% 1/8W |
| RV12 | 1-228-453-00 | RES,VAR,CERMET 100 |
| RV14 | 1-228-456-00 | RES,VAR,CERMET 1K |
| RV1,10 | 1-228-457-00 | RES,VAR,CERMET 2K |
| RV4,9,15 | 1-228-458-00 | RES,VAR,CERMET 5K |
| RV16 | 1-228-459-00 | RES,VAR,CERMET 10K |
| RV6 | 1-228-460-00 | RES,VAR,CERMET 20K |
| RV8 | 1-228-461-00 | RES,VAR,CERMET 50K |
| RV3 | 1-228-462-00 | RES,VAR,CERMET 100K |
| RV11 | 1-228-473-00 | RES,VAR,CERMET 5K |
| RV2 | 1-230-740-21 | RES,VAR,CARBON 5K |
| RB204 | 1-231-404-00 | RES,BLOCK 680x8 |
| RB206,207 | 1-231-449-00 | RES,BLOCK 620x8 |
| RB205 | 1-231-450-00 | RES,BLOCK 3.3Kx8 |
| RB80 | 1-231-517-11 | RES,BLOCK 2.2Kx4 |
| RB210 | 1-231-533-00 | RES,BLOCK 10Kx4 |
| LPF1 | 1-231-621-00 | FILTER,LOW-PASS |
| BPF1 | 1-235-579-11 | FILTER,BANDPASS |
| L5,7,8 | 1-408-409-00 | INDUCTOR,MICRO 10 5% |
| LV2 | 1-409-403-11 | INDUCTOR,VAR 12.9 |
| LV4 | 1-409-404-11 | INDUCTOR,VAR 4.43/4.43MHz |
| LV3 | 1-409-405-11 | INDUCTOR,VAR 8.68/4.43MHz |
| LV1 | 1-410-286-11 | INDUCTOR,VAR 1 |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (AD-22 BOARD,BKH-2350/CARD RACK) | | |
| DL3 | 1-415-430-11 | DELAY LINE,30nS |
| DL1 | 1-415-431-11 | DELAY LINE,50nS |
| DL2 | 1-415-434-11 | DELAY LINE,10nSx5 |
| L1,2,3,4 | 1-421-329-00 | COIL,CHOKE |
| VCO1 | 1-464-515-11 | VCO,17.73MHz |
| CF1 | 1-527-497-00 | FILTER,CERAMIC 4.55MHz |
| S3 | 1-552-509-00 | SWITCH,DIP 1-CKT |
| S2 | 1-553-441-00 | SWITCH,TOGGLE |
| S4 | 1-553-564-00 | SWITCH,ROTARY |
| S1 | 1-570-279-11 | SWITCH,DIP 2-CKT |
| R191,192 | 1-806-887-11 | THERMISTOR,POSITIVE |
| 1pc | 2-282-313-00 | KNOB,CONTROL |
| 1pc () | 2-375-794-01 | LABEL (AD-22),PC BOARD |
| TP1,2,3,4,5,6,7,8,9,10, 11,12,13,14,15,16,17, 20,21,22,23,24,25,26, 27,28,29,30,31,32 () | 3-673-772-41 | TERMINAL,TP |
| 1pc () | 3-673-865-00 | LEVER |
| 1pc () | 3-673-867-00 | PLATE,INDICATION,PC BOARD |
| TPE1,2,3,4,5,6 () | 3-685-366-11 | TERMINAL,TP |
| TP18,19 () | 4-873-906-00 | TERMINAL,TP |
| 1pc | 7-621-737-08 | SET SCREW 2.6x3,FLAT POINT |
| 4pcs | 7-621-981-15 | SCREW,PSW 2.6x6 |
| 2pcs | 7-626-317-21 | PIN,SPRING 2.5x8 |
| D4,5,7,15,16 | 8-719-000-12 | DIODE MC931 |
| D17 | 8-719-102-52 | DIODE 1SZ52 |
| D13 | 8-719-812-41 | LED,TLR124,RED |
| D9 | 8-719-812-43 | LED,TLG124A,GREEN |
| D2,3,6,8,10,11,12,14,18, | 8-719-901-33 | DIODE 1SS133 |
| D1 | 8-719-903-24 | DIODE SVC321SP-A2 |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (AD-22 BOARD,BKH-2350/CARD RACK) | | |
| Q2,6,10,12,14 | 8-729-115-30 | TRANSISTOR 2SK105A-30 |
| Q3,7,19,20 | 8-729-115-54 | TRANSISTOR 2SA1175 |
| Q4,8,9,17 | 8-729-190-12 | TRANSISTOR 2C2901 |
| Q21 | 8-729-672-43 | TRANSISTOR 2SC2724-D |
| Q1,5,11,15,18 | 8-729-900-61 | TRANSISTOR DTA114ES |
| Q13,16 | 8-729-900-80 | TRANSISTOR DTC114ES |
| IC12UV | 8-741-134-10 | IC BX1341 |
| IC1HJK,23A,23EF,45N,56H | 8-743-810-00 | IC BX381 |
| IC12W | 8-752-030-18 | IC CXA1016D |
| IC1M,3PRU | 8-752-306-50 | IC CX23065 |
| IC3X | 8-759-001-16 | IC MC10116L |
| IC2HJ | 8-759-016-48 | IC MC1648P |
| IC5Z1 | 8-759-100-54 | IC UPA54H |
| IC5Z2 | 8-759-100-64 | IC UPA64H |
| IC2PR | 8-759-103-19 | IC UPC319C |
| IC3PRL,6P | 8-759-103-93 | IC UPC393C |
| IC4W,4Y | 8-759-110-37 | IC UPC1037H |
| IC3V | 8-759-135-80 | IC UPC358C |
| IC1KL,1MN,2MN,3Y | 8-759-202-11 | IC TC74HC00P |
| IC2KL,4V | 8-759-202-22 | IC TC74HC74P |
| IC4K | 8-759-202-33 | IC TC74HC240P |
| IC3LM | 8-759-202-74 | IC TC74HC04P |
| IC5U,6V | 8-759-202-86 | IC TC74HC123P |
| IC4L | 8-759-203-18 | IC TC74HC253P |
| IC2BL,4CL,4DU,4EFL,4RU, 4SL,5E,5SL,6S | 8-759-204-94 | IC TC74HC00F |
| IC1DL | 8-759-204-95 | IC TC74HC02F |
| IC4BL,4RL,4SU,6W | 8-759-204-96 | IC TC74HC04F |
| IC2CU,4PU,5RL | 8-759-204-99 | IC TC74HC10F |
| IC1BL,1DU,2BU,2DU,3B, 4CU,4DL,4PL,5RU,5SU | 8-759-205-06 | IC TC74HC74F |
| IC5PU | 8-759-205-08 | IC TC74HC86F |
| IC6R | 8-759-205-11 | IC TC74HC153F |
| IC2CL,2DL,3C,3D,4BU, 4EFU | 8-759-205-16 | IC TC74HC161F |
| IC1CL | 8-759-205-18 | IC TC74HC175F |
| IC1Y,2Y | 8-759-301-01 | IC HD10101 |
| IC6X | 8-759-700-81 | IC NJM555D |
| IC2FH,2LM,2NP,3KL,3MN, 4FH,4M,4U,5L,6N | 8-759-900-01 | IC MC74HC4538N |
| IC5F | 8-759-900-08 | IC SN74LS08N |
| IC5J | 8-759-900-10 | IC SN74LS10N |
| IC5T | 8-759-900-33 | IC SN74LS33N |
| IC6E | 8-759-900-74 | IC SN74LS74AN |
| IC6F | 8-759-901-23 | IC SN74LS123N |
| IC6J | 8-759-901-64 | IC SN74LS164N |
| IC4J,5M,6T,6Y | 8-759-902-21 | IC SN74LS221N |
| IC6U | 8-759-902-66 | IC SN74LS266N |
| IC6K | 8-759-906-86 | IC AM686HC |
| IC5K | 8-759-918-30 | IC TL592P |
| IC1EF,4T | 8-759-918-40 | IC CX20194 |
| IC5V | 8-759-918-41 | IC CX20195 |
| IC5X | 8-759-952-07 | IC SN75207BN |
| IC1JK,1S,3HJ,6A | 8-759-990-82 | IC TL082CP |
| IC1P | 8-759-990-84 | IC TL084CN |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| MY-26 BOARD (BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-706-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| 1pc () | A-6259-279-A | COMPLETE PCB,MY-26 |
| (This assembly includes the following parts.) | | |
| 1pc () | X-3673-641-0 | PLATE ASSY,SHIELD |
| C4,9 | 1-123-307-00 | CAP,ELECT 100 20% 6.3V |
| C49,54,55,56 | 1-131-373-00 | CAP,TANT 22 10% 16V |
| C59,60 | 1-131-387-00 | CAP,TANT 47 10% 6.3V |
| C6,8,15,17,22,27,32,37, 44,48 | 1-131-449-11 | CAP,TANT 3.3 20% 16V |
| C1,2,3,5,7,10,11,12,13, 14,16,18,19,20,21,23, 24,25,26,28,29,30,31, 33,34,35,36,38,39,40, 41,43,45,46,47,50,51, 52,53,57,61,62 | 1-161-894-00 | CAP,CERAMIC 0.1 +80/-20% 50V |
| R14,25 | 1-214-533-00 | RES,METAL 100 1% 1/8W |
| R16 | 1-214-546-00 | RES,METAL 360 1% 1/8W |
| R19,23,24,26 | 1-214-557-00 | RES,METAL 1K 1% 1/8W |
| R22 | 1-214-563-00 | RES,METAL 1.8K 1% 1/8W |
| R1,2,4,5,6,7,8,9,10,11, 12,13,15,17,18,20,21 | 1-214-581-00 | RES,METAL 10K 1% 1/8W |
| RB2 | 1-231-404-00 | RES,BLOCK 680x8 |
| CR1,2,3,4,5 | 1-231-455-00 | CR PACK |
| CR6 | 1-231-456-00 | CR PACK |
| RB4,6 | 1-231-505-11 | RES,BLOCK 680x4 |
| RB3,5 | 1-231-516-00 | RES,BLOCK 2Kx4 |
| RB1 | 1-231-533-00 | RES,BLOCK 10Kx4 |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (MY-26 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-706-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| L1,2 | 1-421-329-00 | COIL,CHOKE |
| S4 | 1-552-509-00 | SWITCH,DIP,1-CKT |
| S2 | 1-553-441-00 | SWITCH,TOGGLE |
| S1 | 1-553-441-21 | SWITCH,TOGGLE |
| 1pc () | 2-375-759-01 | LABEL (MY-26),PC BOARD |
| TP1,2,4,5,6,7,8,9,10 () | 3-673-772-41 | TERMINAL,TP |
| 1pc () | 3-673-865-00 | LEVER |
| 1pc () | 3-673-867-00 | PLATE,INDICATION,PC BOARD |
| TPE1,2,3,4,5,6 () | 3-685-366-11 | TERMINAL,TP |
| TP3 () | 4-873-906-00 | TERMINAL,TP |
| 4pcs | 7-621-981-15 | SCREW,PSW 2.6x6 |
| 2pcs | 7-626-317-21 | PIN,SPRING 2.5x8 |
| D1 | 8-719-812-41 | LED,TLR124,RED |
| Q1 | 8-729-982-22 | TRANSISTOR 2SB822 |
| IC1,2,3,4 | 8-741-128-80 | IC BX1288 |
| IC5,6,8,9 | 8-741-128-90 | IC BX1289 |
| IC10,11 | 8-741-135-50 | IC BX1355 |
| IC6F | 8-759-001-07 | IC MC74HC10N |
| IC4P | 8-759-001-38 | IC MC74HC163N |
| IC3R,6H,6R | 8-759-001-39 | IC MC74HC164N |
| IC6V | 8-759-001-42 | IC MC74HC174N |
| IC4X,6B,6K,6S | 8-759-202-11 | IC TC74HC00P |
| IC4Y,5W | 8-759-202-14 | IC TC74HC08P |
| IC6M | 8-759-202-16 | IC TC74HC11P |
| IC5E | 8-759-202-19 | IC TC74HC21P |
| IC2T,5G,5X,6U,6X | 8-759-202-21 | IC TC74HC32P |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (MY-26 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-706-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| IC3S,5N,5P | 8-759-202-22 | IC TC74HC74P |
| IC4Z,5A,5C,5M,6P | 8-759-202-24 | IC TC74HC86P |
| IC5T,6T | 8-759-202-27 | IC TC74HC157P |
| IC4L,5R,5Y | 8-759-202-33 | IC TC74HC240P |
| IC6W | 8-759-202-93 | IC TC74HC153P |
| IC4T | 8-759-203-01 | IC MC74HC175N |
| IC2G | 8-759-203-16 | IC TC74HCT244P |
| IC1N,1S,1T,2D,2S,3N,4E, 5S | 8-759-203-51 | IC TC74HCT574P |
| IC1Y,2Y,3Y | 8-759-300-25 | IC HD10125 |
| IC1U,2R | 8-759-300-67 | IC HM6168HP-45 |
| IC3B | 8-759-765-46 | IC,PROM MB7112E-DLA |
| IC3D | 8-759-765-39 | IC,PROM MB7134H-IDH |
| IC3E | 8-759-765-40 | IC,PROM MB7134H-IDL |
| IC4N | 8-759-900-04 | IC SN74LS04N |
| IC4M | 8-759-900-10 | IC SN74LS10N |
| IC4R | 8-759-900-32 | IC SN74LS32N |
| IC1F,1G | 8-759-901-57 | IC SN74LS157N |
| IC5J,6J | 8-759-901-74 | IC SN74LS174N |
| IC4W | 8-759-901-75 | IC SN74LS175N |
| IC3T,5K,6N | 8-759-902-40 | IC SN74LS240N |
| IC1D,1E | 8-759-903-99 | IC SN74LS399N |
| IC5U | 8-759-904-79 | IC 74F00PC |
| IC5V | 8-759-904-81 | IC 74F08PC |
| IC6G | 8-759-904-82 | IC 74F10PC |
| IC4V | 8-759-904-84 | IC 74F74PC |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (MY-26 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-706-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| IC4F | 8-759-909-47 | IC SN74ALS574N |
| IC1B | 8-759-916-07 | IC CX23038 |
| IC7 | 8-759-918-31 | IC CX23082 |
| IC4G | 8-759-918-32 | IC CX20219 |
| IC1M,4A,4C,5L | 8-759-918-33 | IC CX20160 |
| IC2F,3G | 8-759-918-34 | IC CX20161 |
| IC3U | 8-759-918-36 | IC CX20163 |
| IC2U | 8-759-918-37 | IC CX20164 |
| IC2E,3F | 8-759-918-39 | IC CX20167 |
| IC1R,4D,5H | 8-759-918-40 | IC CX20194 |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| MY-26 BOARD (BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-706-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| 1pc | () A-6259-279-B | COMPLETE PCB,MY-26 |
| (This assembly includes the following parts.) | | |
| 1pc | () X-3673-641-0 | PLATE ASSY,SHIELD |
| C4,9 | 1-123-307-00 | CAP,ELECT 100 20% 6.3V |
| C49,54,55,56 | 1-131-373-00 | CAP,TANT 22 10% 16V |
| C59,60 | 1-131-387-00 | CAP,TANT 47 10% 6.3V |
| C6,8,15,17,22,27,32,37, 44,48 | 1-131-449-11 | CAP,TANT 3.3 20% 16V |
| C1,2,3,5,7,10,11,12,13, 14,16,18,19,20,21,23, 24,25,26,28,29,30,31, 33,34,35,36,38,39,40, 41,43,45,46,47,50,51, 52,53,57,61,62 | 1-161-894-00 | CAP,CERAMIC 0.1 +80/-20% 50V |
| R14,25 | 1-214-533-00 | RES,METAL 100 1% 1/8W |
| R16 | 1-214-546-00 | RES,METAL 360 1% 1/8W |
| R19,23,24,26 | 1-214-557-00 | RES,METAL 1K 1% 1/8W |
| R22,27 | 1-214-563-00 | RES,METAL 1.8K 1% 1/8W |
| R1,2,4,5,6,7,8,9,10,11, 12,13,15,17,18,20,21 | 1-214-581-00 | RES,METAL 10K 1% 1/8W |
| RB2 | 1-231-404-00 | RES,BLOCK 680x8 |
| CR1,2,3,4,5 | 1-231-455-00 | CR PACK |
| CR6 | 1-231-456-00 | CR PACK |
| RB4,6 | 1-231-505-11 | RES,BLOCK 680x4 |
| RB3,5 | 1-231-516-00 | RES,BLOCK 2Kx4 |
| RB1 | 1-231-533-00 | RES,BLOCK 10Kx4 |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (MY-26 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-706-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| L1,2 | 1-421-329-00 | COIL,CHOKE |
| S4 | 1-552-509-00 | SWITCH,DIP,1-CKT |
| S2 | 1-553-441-00 | SWITCH,TOGGLE |
| S1 | 1-553-441-21 | SWITCH,TOGGLE |
| 1pc | () 2-375-759-01 | LABEL (MY-26),PC BOARD |
| JP1,2 | 1-560-733-00 | PIN,SHORT |
| 1pc | 1-561-832-00 | PLUG,SHORT |
| TP1,2,4,5,6,7,8,9,10 | () 3-673-772-41 | TERMINAL,TP |
| 1pc | () 3-673-865-00 | LEVER |
| 1pc | () 3-673-867-00 | PLATE,INDICATION,PC BOARD |
| TPE1,2,3,4,5,6 | () 3-685-366-11 | TERMINAL,TP |
| TP3 | () 4-873-906-00 | TERMINAL,TP |
| 4pcs | 7-621-981-15 | SCREW,PSW 2.6x6 |
| 2pcs | 7-626-317-21 | PIN,SPRING 2.5x8 |
| D1 | 8-719-812-41 | LED,TLR124,RED |
| Q1 | 8-729-982-22 | TRANSISTOR 2SB822 |
| IC1,2,3,4 | 8-741-128-80 | IC BX1288 |
| IC5,6,8,9 | 8-741-128-90 | IC BX1289 |
| IC10,11 | 8-741-135-50 | IC BX1355 |
| IC6F | 8-759-001-07 | IC MC74HC10N |
| IC4P | 8-759-001-38 | IC MC74HC163N |
| IC3R,6H,6R | 8-759-001-39 | IC MC74HC164N |
| IC6V | 8-759-001-42 | IC MC74HC174N |
| IC4X,6E,6K,6S | 8-759-202-11 | IC TC74HC00P |
| IC4Y,5W | 8-759-202-14 | IC TC74HC08P |
| IC6M | 8-759-202-16 | IC TC74HC11P |
| IC5E | 8-759-202-19 | IC TC74HC21P |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (MY-26 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-706-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| IC2T,5G,5X,6U,6X | 8-759-202-21 | IC TC74HC32P |
| IC3S,5N,5P | 8-759-202-22 | IC TC74HC74P |
| IC4Z,5D,5M,6D,6P | 8-759-202-24 | IC TC74HC86P |
| IC5T,6T | 8-759-202-27 | IC TC74HC157P |
| IC4L,5R,5Y | 8-759-202-33 | IC TC74HC240P |
| IC6W | 8-759-202-93 | IC TC74HC153P |
| IC4T | 8-759-203-01 | IC MC74HC175N |
| IC2G,5A | 8-759-203-16 | IC TC74HCT244P |
| IC1N,1S,1T,2D,2S,3N,4E, 5S | 8-759-203-51 | IC TC74HCT574P |
| IC1Y,2Y,3Y | 8-759-300-25 | IC HD10125 |
| IC1U,2R | 8-759-300-67 | IC HM6168HP-45 |
| IC3B | 8-759-765-46 | IC,PROM MB7112E-DLA |
| IC3D | 8-759-767-15 | IC,PROM MB7134H-IDH2 |
| IC3E | 8-759-767-16 | IC,PROM MB7134H-IDL2 |
| IC4N | 8-759-900-04 | IC SN74LS04N |
| IC4M | 8-759-900-10 | IC SN74LS10N |
| IC4R | 8-759-900-32 | IC SN74LS32N |
| IC1F,1G | 8-759-901-57 | IC SN74LS157N |
| IC5J,6J | 8-759-901-74 | IC SN74LS174N |
| IC4W | 8-759-901-75 | IC SN74LS175N |
| IC3T,5K,6N | 8-759-902-40 | IC SN74LS240N |
| IC1D,1E | 8-759-903-99 | IC SN74LS399N |
| IC5U | 8-759-904-79 | IC 74F00PC |
| IC5V | 8-759-904-81 | IC 74F08PC |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (MY-26 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-706-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| IC6G | 8-759-904-82 | IC 74F10PC |
| IC4V | 8-759-904-84 | IC 74F74PC |
| IC4F | 8-759-909-47 | IC SN74ALS574N |
| IC1B | 8-759-916-07 | IC CX23038 |
| IC7 | 8-759-918-31 | IC CX23082 |
| IC4G | 8-759-918-32 | IC CX20219 |
| IC1M,4A,5C,5L | 8-759-918-33 | IC CX20160 |
| IC2F,3G | 8-759-918-34 | IC CX20161 |
| IC3U | 8-759-918-36 | IC CX20163 |
| IC2U | 8-759-918-37 | IC CX20164 |
| IC2E,3F | 8-759-918-39 | IC CX20167 |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| SG-17 BOARD (BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-707-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| 1pc | () A-6259-278-A | COMPLETE PCB,SG-17 |
| (This assembly includes the following parts.) | | |
| 1pc | () X-3673-641-0 | PLATE ASSY,SHIELD |
| C200 | 1-102-114-00 | CAP,CERAMIC 470PF 10% 50V |
| C69,137,185 | 1-107-075-00 | CAP,MICA 39PF 5% 50V |
| C89 | 1-107-076-00 | CAP,MICA 43PF 5% 50V |
| C78,85 | 1-107-158-00 | CAP,MICA 30PF 5% 500V |
| C68 | 1-107-206-00 | CAP,MICA 15PF 5% 500V |
| C76,186 | 1-107-209-00 | CAP,MICA 20PF 5% 500V |
| C79 | 1-109-526-00 | CAP,MICA 43PF 5% 100V |
| C202 | 1-109-529-11 | CAP,MICA 56PF 5% 100V |
| C72 | 1-109-531-00 | CAP,MIKA 63PF 5% 100V |
| C124,127,128 | 1-109-535-00 | CAP,MICA 100PF 5% 100V |
| C88 | 1-109-537-00 | CAP,MICA 120PF 5% 100V |
| C58,130,145 | 1-109-541-00 | CAP,MICA 200PF 5% 100V |
| C25,26,181,184 | 1-109-542-00 | CAP,MICA 220PF 5% 100V |
| C67 | 1-109-546-00 | CAP,MICA 300PF 5% 100V |
| C125 | 1-109-549-00 | CAP,MICA 390PF 5% 100V |
| C52,53,156,158 | 1-123-330-00 | CAP,ELECT 100 20% 16V |
| C42,146,147,149,150, 154,155 | 1-130-471-00 | CAP,MYLAR 0.001 5% 50V |
| C144 | 1-130-472-00 | CAP,MYLAR 0.0012 5% 50V |
| C109 | 1-130-473-00 | CAP,MYLAR 0.0015 5% 50V |
| C107 | 1-130-475-00 | CAP,MYLAR 0.0022 5% 50V |
| C100 | 1-130-476-00 | CAP,MYLAR 0.0027 5% 50V |
| C33 | 1-130-479-00 | CAP,MYLAR 0.0047 5% 50V |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (SG-17 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-707-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| C73 | 1-130-489-00 | CAP,MYLAR 0.033 5% 50V |
| C48,75 | 1-130-495-00 | CAP,MYLAR 0.1 5% 50V |
| C39 | 1-131-346-00 | CAP,TANT 0.68 10% 35V |
| C182,183 | 1-131-347-00 | CAP,TANT 1 10% 35V |
| C60 | 1-131-349-00 | CAP,TANT 2.2 10% 35V |
| C17,18,104 | 1-131-353-00 | CAP,TANT 10 10% 35V |
| C65,66,71,74,77,80,81, 86,90,91,92,93,94,99, 101,102,108,110,111, 112,117,118,122,123, 126,187 | 1-131-449-11 | CAP,TANT 3.3 20% 16V |
| C201 | 1-161-039-00 | CAP,CERAMIC 0.001MF 10% 50V |
| C4,138,180 | 1-161-888-00 | CAP,CERAMIC 0.01MF +80/-20% 50V |
| C13,16,43,49,83,87, 119,120 | 1-161-890-11 | CAP,CERAMIC 0.022MF +80/-20% 50V |
| C1,2,3,5,6,7,8,9,10,11, 12,14,15,19,20,21,22, 23,24,27,28,29,30,32, 34,35,36,37,38,40,41, 44,45,46,47,50,51,54, 55,56,57,59,62,63,64, 70,82,84,95,96,97,98, 103,105,106,113,114, 115,116,121,131,132, 133,134,135,136,139, 140,141,142,143,148, 151,153,157,159,160, 161,178,179 | 1-161-894-00 | CAP,CERAMIC 0.1MF +80/-20% 50V |
| C162,163,164,165,166, 167,168,169,170,171, 172,173,174,175,176, 177 | 1-163-017-00 | CAP,CHIP CERAMIC 4700PF 10% 50V |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (SG-17 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-707-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| R141 | 1-214-526-00 | RES,METAL 51 1% 1/8W |
| R147 | 1-214-527-00 | RES,METAL 56 1% 1/8W |
| R23,44,53,54 | 1-214-553-00 | RES,METAL 100 1% 1/8W |
| R48,88 | 1-214-537-00 | RES,METAL 150 1% 1/8W |
| R110 | 1-214-540-00 | RES,METAL 200 1% 1/8W |
| R143,145,205 | 1-214-544-00 | RES,METAL 300 1% 1/8W |
| R79,103,105,109,189 | 1-214-545-00 | RES,METAL 330 1% 1/8W |
| R20,21 | 1-214-547-00 | RES,METAL 390 1% 1/8W |
| R52,91,142,176,183,184 | 1-214-550-00 | RES,METAL 510 1% 1/8W |
| R1,2,3,24,25,83,96,99, 100,137,140,146,168 | 1-214-557-00 | RES,METAL 1K 1% 1/8W |
| R67 | 1-214-558-00 | RES,METAL 1.1K 1% 1/8W |
| R144,204 | 1-214-559-00 | RES,METAL 1.2K 1% 1/8W |
| R148 | 1-214-561-00 | RES,METAL 1.5K 1% 1/8W |
| R17,18,41,82,86,178 | 1-214-564-00 | RES,METAL 2K 1% 1/8W |
| R43,134,135,182,185, 200 | 1-214-565-00 | RES,METAL 2.2K 1% 1/8W |
| R36 | 1-214-566-00 | RES,METAL 2.4K 1% 1/8W |
| R51 | 1-214-567-00 | RES,METAL 2.7K 1% 1/8W |
| R149,201 | 1-214-568-00 | RES,METAL 3K 1% 1/8W |
| R9,34,104 | 1-214-569-00 | RES,METAL 3.3K 1% 1/8W |
| R42,60,66,92 | 1-214-571-00 | RES,METAL 3.9K 1% 1/8W |
| R131,132 | 1-214-572-00 | RES,METAL 4.3K 1% 1/8W |
| R29 | 1-214-573-00 | RES,METAL 4.7K 1% 1/8W |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (SG-17 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-707-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| R22,33,37,150,158 | 1-214-574-00 | RES,METAL 5.1K 1% 1/8W |
| R84 | 1-214-575-00 | RES,METAL 5.6K 1% 1/8W |
| R26,64 | 1-214-576-00 | RES,METAL 6.2K 1% 1/8W |
| R101 | 1-214-578-00 | RES,METAL 7.5K 1% 1/8W |
| R31,57,75,97 | 1-214-579-00 | RES,METAL 8.2K 1% 1/8W |
| R16,46,59,61,62,74,89, 90,98,108,111,115,118, 125,151,152,155,156, 157,159,169,175,206 | 1-214-581-00 | RES,METAL 10K 1% 1/8W |
| R73 | 1-214-585-00 | RES,METAL 15K 1% 1/8W |
| R63,68,70,160 | 1-214-586-00 | RES,METAL 16K 1% 1/8W |
| R55,58,127,129,130 | 1-214-587-00 | RES,METAL 18K 1% 1/8W |
| R65,80 | 1-214-588-00 | RES,METAL 20K 1% 1/8W |
| R203 | 1-214-589-00 | RES,METAL 22K 1% 1/8W |
| R102,128 | 1-214-590-00 | RES,METAL 24K 1% 1/8W |
| R8,15,81,116,153,154 | 1-214-592-00 | RES,METAL 30K 1% 1/8W |
| R136,164 | 1-214-593-00 | RES,METAL 33K 1% 1/8W |
| R36 | 1-215-420-00 | RES,METAL 910 1% 1/6W |
| R210 | 1-215-445-00 | RES,METAL 10K 1% 1/6W |
| R19 | 1-215-465-00 | RES,METAL 68K 1% 1/6W |
| R13 | 1-215-470-00 | RES,METAL 110K 1% 1/6W |
| R50,174 | 1-215-473-00 | RES,METAL 150K 1% 1/6W |
| R7,47 | 1-215-475-00 | RES,METAL 180K 1% 1/6W |
| R12 | 1-215-477-00 | RES,METAL 220K 1% 1/6W |
| R181 | 1-215-481-00 | RES,METAL 330K 1% 1/6W |
| R14 | 1-215-490-00 | RES,METAL 750K 1% 1/6W |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (SG-17 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-707-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| R93,124,161,162,163 | 1-215-493-00 | RES,METAL 1M 1% 1/6W |
| R11,49,171 | 1-215-821-11 | RES,METAL 43K 1% 1/8W |
| R30,45,69,87,106,107, 113,114,119,120,121, 122,123,126,166,172, 179,180,186,187,188, 202 | 1-215-822-11 | RES,METAL 47K 1% 1/8W |
| R6,85,112,165,170 | 1-215-823-11 | RES,METAL 51K 1% 1/8W |
| R173 | 1-215-825-11 | RES,METAL 62K 1% 1/8W |
| R56 | 1-215-829-11 | RES,METAL 91K 1% 1/8W |
| R4,5,10,27,32,94,71,72, 117,167 | 1-215-830-11 | RES,METAL 100K 1% 1/8W |
| R11 | 1-216-237-00 | RES,CARBON 43K 5% 1/10W |
| RV13 | 1-228-456-00 | RES,VAR,CERMET 1K |
| RV3,5,15 | 1-228-459-00 | RES,VAR,CERMET 10K |
| RV1,6,11,16 | 1-228-460-00 | RES,VAR,CERMET 20K |
| RV14 | 1-228-461-00 | RES,VAR,CERMET 50K |
| RV2,4,12 | 1-228-462-00 | RES,VAR,CERMET 100K |
| RV7,8,9,10 | 1-230-740-21 | RES,VAR,CARBON 5K |
| RB2 | 1-231-449-00 | RES,BLOCK 620x8 |
| RB1 | 1-231-533-00 | RES,BLOCK 10Kx4 |
| RB4,6 | 1-231-549-11 | RES,BLOCK 47Kx4 |
| RB5 | 1-235-005-00 | RES,BLOCK 47Kx8 |
| BPF1 | 1-235-577-11 | FILTER,BANDPASS |
| L5 | 1-408-429-00 | INDUCTOR,MICRO 470 5% |
| LV1 | 1-410-288-11 | INDUCTOR,VAR 6.8 |
| DL2 | 1-415-431-11 | DELAY LINE,50nS |
| DL1 | 1-415-449-11 | DELAY LINE,20nS |
| L1,2,3,4 | 1-421-329-00 | COIL,CHOKE |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (SG-17 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-707-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| X1 | 1-527-585-00 | VCO,17.734475MHz |
| X2 | 1-527-729-00 | VCO,14.187500MHz |
| FB1,2 | 1-535-178-00 | FERRITE BEAD |
| S4,7,8,9 | 1-552-509-00 | SWITCH,DIP,1-CKT |
| S6 | 1-553-441-00 | SWITCH,TOGGLE |
| S2,3 | 1-570-277-11 | SWITCH,DIP,8-CKT |
| S1 | 1-570-280-11 | SWITCH,DIP,6-CKT |
| R28 | 1-807-239-11 | THERMISTOR,POSITIVE 3K |
| 4pcs | 2-282-313-00 | KNOB,CONTROL |
| 1pc | () 2-375-796-01 | LABEL (SG-17),PC BOARD |
| TP1,2,5,6,7,8,9 | () 3-673-772-41 | TERMINAL,TP |
| 1pc | () 3-673-865-00 | LEVER |
| 1pc | () 3-673-867-00 | PLATE,INDICATION,PC BOARD |
| TPE1,2,3,4,5,6 | () 3-685-366-11 | TERMINAL,TP |
| TP3,4,10,11,12,13,16, 17,18,19,20 | () 4-873-906-00 | TERMINAL,TP |
| 4pcs | 7-621-737-08 | SET SCREW 2.6x3,FLAT POINT |
| 4pcs | 7-621-981-15 | SCREW,PSW 2.6x6 |
| 2pcs | 7-626-317-21 | PIN,SPRING 2.5x8 |
| D11,14 | 8-719-000-12 | DIODE MC931 |
| D3 | 8-719-100-27 | DIODE RD4.7E-B2 |
| D10 | 8-719-812-41 | LED TLR124,RED |
| D9 | 8-719-812-43 | LED TLG124A,GREEN |
| D1,2,3,4,5,6,7,8,12,13, 15 | 8-719-901-33 | DIODE 1SS133 |
| Q4 | 8-729-115-30 | TRANSISTOR 2SK105A-GR |
| Q2,9 | 8-729-117-54 | TRANSISTOR 2SA1175 |
| Q3,6,7,8,10 | 8-729-190-12 | TRANSISTOR 2SC2901 |
| Q5,11 | 8-729-900-65 | TRANSISTOR DTA144ES |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (SG-17 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-707-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| IC1,1R | 8-743-810-00 | IC BX381 |
| IC7,12 | 8-757-930-11 | IC CX7930A |
| IC1Q | 8-759-103-19 | IC UPC319C |
| IC1S | 8-759-103-93 | IC UPC393C |
| IC3P,3Q,4P,4Q | 8-759-140-51 | IC UPD4051BC |
| IC2H,3R,4S,5J,5K,5R | 8-759-202-11 | IC TC74HC00P |
| IC4J,5T | 8-759-202-14 | IC TC74HC08P |
| IC3H,4H,4R | 8-759-202-22 | IC TC74HC74P |
| IC3C,4G,5P,5S | 8-759-202-86 | IC TC74HC123P |
| IC4A | 8-759-203-68 | IC TC74HC4040P |
| IC11 | 8-759-204-96 | IC TC74HC04F |
| IC8 | 8-759-205-11 | IC TC74HC153F |
| IC9 | 8-759-205-37 | IC TC74HC574F |
| IC2U | 8-759-301-24 | IC HD10124 |
| IC3N | 8-759-765-92 | IC,PROM MB7112E-PJD |
| IC5 (FOR SERIAL NUMBER 10001 TO 10299) | 8-759-765-93 | IC,PROM HN27C64G-SEC |
| (FOR SERIAL NUMBER 10301 AND UP) | 8-759-766-28 | IC,PROM HN27C64G-SEC1 |
| IC4 (FOR SERIAL NUMBER 10001 TO 10299) | 8-759-765-94 | IC,PROM HN27C64G-PXL |
| (FOR SERIAL NUMBER 10301 AND UP) | 8-759-766-78 | IC,PROM HN27C64G-PXL2 |
| IC2J,2L,2Q,2T,3F,4C,4F, 4L,4U | 8-759-900-00 | IC SN74LS00M |
| IC2D,4T | 8-759-900-04 | IC SN74LS04N |
| IC3J | 8-759-900-10 | IC SN74LS10N |
| IC6M,6R | 8-759-900-59 | IC HI1-0201-5 |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (SG-17 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-707-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| IC2E,2M,2P,3T,5L,5Q | 8-759-900-74 | IC SN74LS74AN |
| IC4K,5H | 8-759-900-86 | IC SN74LS86N |
| IC2K,2R,6C | 8-759-901-23 | IC SN74LS123N |
| IC3D | 8-759-901-63 | IC SN74LS163AN |
| IC3G | 8-759-901-64 | IC SN74LS164N |
| IC2G,2N,2S,3U | 8-759-902-21 | IC SN74LS221N |
| IC3E | 8-759-903-99 | IC SN74LS399N |
| IC3M | 8-759-904-09 | IC SN74LS688N |
| IC3K | 8-759-904-18 | IC SN74ALS00AN |
| IC5G | 8-759-904-79 | IC 74F00PC |
| IC1C,1D,2B | 8-759-906-07 | IC TL607CP |
| IC10 | 8-759-908-39 | IC CX7998 |
| IC3S | 8-759-917-65 | IC 74F193PC |
| IC1H,6G,6L | 8-759-918-23 | IC NE527N |
| IC2 | 8-759-918-30 | IC TL592P |
| IC2F | 8-759-918-33 | IC CX20160 |
| IC1F | 8-759-918-35 | IC CX20162 |
| IC3L | 8-759-918-40 | IC CX20194 |
| IC1A,1B,1L,2A,6D,6N | 8-759-990-82 | IC TL082CP |
| IC1P,6Q,6S | 8-759-990-84 | IC TL084CN |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|

SG-17 BOARD (BKH-2350/CARD RACK)
BOARD NO.1-615-707-13 & UP
SERIAL NO. 10701 & UP

| | | |
|---|---|---|
| 1pc () | A-6259-278-B | COMPLETE PCB,SG-17 |
| (This assembly includes the following parts.) | | |
| 1pc () | X-3673-641-0 | PLATE ASSY,SHIELD |
| C200 | 1-102-114-00 | CAP,CERAMIC 470PF 10% 50V |
| C69,137,185 | 1-107-075-00 | CAP,MICA 39PF 5% 50V |
| C89 | 1-107-076-00 | CAP,MICA 43PF 5% 50V |
| C78,85 | 1-107-158-00 | CAP,MICA 30PF 5% 500V |
| C68 | 1-107-206-00 | CAP,MICA 15PF 5% 500V |
| C76,186 | 1-107-209-00 | CAP,MICA 20PF 5% 500V |
| C79 | 1-109-526-00 | CAP,MICA 43PF 5% 100V |
| C202 | 1-109-529-11 | CAP,MICA 56PF 5% 100V |
| C72 | 1-109-531-00 | CAP,MIKA 63PF 5% 100V |
| C124,127,128 | 1-109-535-00 | CAP,MICA 100PF 5% 100V |
| C88 | 1-109-537-00 | CAP,MICA 120PF 5% 100V |
| C58,130,145 | 1-109-541-00 | CAP,MICA 200PF 5% 100V |
| C25,26,181,184 | 1-109-542-00 | CAP,MICA 220PF 5% 100V |
| C67 | 1-109-546-00 | CAP,MICA 300PF 5% 100V |
| C125 | 1-109-549-00 | CAP,MICA 390PF 5% 100V |
| C52,53,156,158 | 1-123-330-00 | CAP,ELECT 100 20% 16V |
| C42,146,147,149,150, 154,155 | 1-130-471-00 | CAP,MYLAR 0.001 5% 50V |
| C144 | 1-130-472-00 | CAP,MYLAR 0.0012 5% 50V |
| C109 | 1-130-473-00 | CAP,MYLAR 0.0015 5% 50V |
| C107 | 1-130-475-00 | CAP,MYLAR 0.0022 5% 50V |
| C100 | 1-130-476-00 | CAP,MYLAR 0.0027 5% 50V |
| C33 | 1-130-479-00 | CAP,MYLAR 0.0047 5% 50V |


| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|

(SG-17 BOARD,BKH-2350/CARD RACK)
BOARD NO.1-615-707-13 & UP
SERIAL NO. 10701 & UP


| | | |
|---|---|---|
| C73 | 1-130-489-00 | CAP,MYLAR 0.033 5% 50V |
| C48,75 | 1-130-495-00 | CAP,MYLAR 0.1 5% 50V |
| C39 | 1-131-346-00 | CAP,TANT 0.68 10% 35V |
| C182,183 | 1-131-347-00 | CAP,TANT 1 10% 35V |
| C60 | 1-131-349-00 | CAP,TANT 2.2 10% 35V |
| C17,18,104 | 1-131-353-00 | CAP,TANT 10 10% 35V |
| C65,66,71,74,77,80,81, 86,90,91,92,93,94,99, 101,102,108,110,111, 112,117,118,122,123, 126,187 | 1-131-449-11 | CAP,TANT 3.3 20% 16V |
| C201 | 1-161-039-00 | CAP,CERAMIC 0.001MF 10% 50V |
| C4,138,180 | 1-161-888-00 | CAP,CERAMIC 0.01MF +80/-20% 50V |
| C13,16,43,49,83,87, 119,120 | 1-161-890-11 | CAP,CERAMIC 0.022MF +80/-20% 50V |
| C1,2,3,5,6,7,8,9,10,11, 12,14,15,19,20,21,22, 23,24,27,28,29,30,32, 34,35,36,37,38,40,41, 44,45,46,47,50,51,54, 55,56,57,59,62,63,64, 70,82,84,95,96,97,98, 103,105,106,113,114, 115,116,121,131,132, 133,134,135,136,139, 140,141,142,143,148, 151,153,157,159,160, 161,178,179 | 1-161-894-00 | CAP,CERAMIC 0.1MF +80/-20% 50V |
| C162,163,164,165,166, 167,168,169,170,171, 172,173,174,175,176, 177 | 1-163-017-00 | CAP,CHIP CERAMIC 4700PF 10% 50V |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (SG-17 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-707-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| R141 | 1-214-526-00 | RES,METAL 51 1% 1/8W |
| R147 | 1-214-527-00 | RES,METAL 56 1% 1/8W |
| R23,44,53,54 | 1-214-553-00 | RES,METAL 100 1% 1/8W |
| R48,88 | 1-214-537-00 | RES,METAL 150 1% 1/8W |
| R110 | 1-214-540-00 | RES,METAL 200 1% 1/8W |
| R143,145,205 | 1-214-544-00 | RES,METAL 300 1% 1/8W |
| R79,103,105,109,189 | 1-214-545-00 | RES,METAL 330 1% 1/8W |
| R20,21 | 1-214-547-00 | RES,METAL 390 1% 1/8W |
| R52,91,142,176,183,184 | 1-214-550-00 | RES,METAL 510 1% 1/8W |
| R1,2,3,24,25,83,96,99, 100,137,140,146,168 | 1-214-557-00 | RES,METAL 1K 1% 1/8W |
| R67 | 1-214-558-00 | RES,METAL 1.1K 1% 1/8W |
| R144,204 | 1-214-559-00 | RES,METAL 1.2K 1% 1/8W |
| R148 | 1-214-561-00 | RES,METAL 1.5K 1% 1/8W |
| R17,18,41,82,86,178 | 1-214-564-00 | RES,METAL 2K 1% 1/8W |
| R43,134,135,182,185, 200 | 1-214-565-00 | RES,METAL 2.2K 1% 1/8W |
| R36 | 1-214-566-00 | RES,METAL 2.4K 1% 1/8W |
| R51 | 1-214-567-00 | RES,METAL 2.7K 1% 1/8W |
| R149,201 | 1-214-568-00 | RES,METAL 3K 1% 1/8W |
| R9,34,104 | 1-214-569-00 | RES,METAL 3.3K 1% 1/8W |
| R42,60,66,92 | 1-214-571-00 | RES,METAL 3.9K 1% 1/8W |
| R131,132 | 1-214-572-00 | RES,METAL 4.3K 1% 1/8W |
| R29 | 1-214-573-00 | RES,METAL 4.7K 1% 1/8W |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (SG-17 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-707-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| R22,33,37,150,158 | 1-214-574-00 | RES,METAL 5.1K 1% 1/8W |
| R84 | 1-214-575-00 | RES,METAL 5.6K 1% 1/8W |
| R26,64 | 1-214-576-00 | RES,METAL 6.2K 1% 1/8W |
| R101 | 1-214-578-00 | RES,METAL 7.5K 1% 1/8W |
| R31,57,75,97 | 1-214-579-00 | RES,METAL 8.2K 1% 1/8W |
| R16,46,59,61,62,74,89, 90,98,108,111,115,118, 125,151,152,155,156, 157,159,169,175,206 | 1-214-581-00 | RES,METAL 10K 1% 1/8W |
| R73 | 1-214-585-00 | RES,METAL 15K 1% 1/8W |
| R63,68,70,160 | 1-214-586-00 | RES,METAL 16K 1% 1/8W |
| R55,58,127,129,130 | 1-214-587-00 | RES,METAL 18K 1% 1/8W |
| R65,80 | 1-214-588-00 | RES,METAL 20K 1% 1/8W |
| R203 | 1-214-589-00 | RES,METAL 22K 1% 1/8W |
| R102,128 | 1-214-590-00 | RES,METAL 24K 1% 1/8W |
| R8,15,81,116,153,154 | 1-214-592-00 | RES,METAL 30K 1% 1/8W |
| R136,164 | 1-214-593-00 | RES,METAL 33K 1% 1/8W |
| R36 | 1-215-420-00 | RES,METAL 910 1% 1/6W |
| R210 | 1-215-445-00 | RES,METAL 10K 1% 1/6W |
| R19 | 1-215-465-00 | RES,METAL 68K 1% 1/6W |
| R13 | 1-215-470-00 | RES,METAL 110K 1% 1/6W |
| R50,174 | 1-215-473-00 | RES,METAL 150K 1% 1/6W |
| R7,47 | 1-215-475-00 | RES,METAL 180K 1% 1/6W |
| R12 | 1-215-477-00 | RES,METAL 220K 1% 1/6W |
| R181 | 1-215-481-00 | RES,METAL 330K 1% 1/6W |
| R14 | 1-215-490-00 | RES,METAL 750K 1% 1/6W |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (SG-17 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-707-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| R93,124,161,162,163 | 1-215-493-00 | RES,METAL 1M 1% 1/6W |
| R11,49,171 | 1-215-821-11 | RES,METAL 43K 1% 1/8W |
| R30,45,69,87,106,107, 113,114,119,120,121, 122,123,126,166,172, 179,180,186,187,188, 202 | 1-215-822-11 | RES,METAL 47K 1% 1/8W |
| R6,85,112,165,170 | 1-215-823-11 | RES,METAL 51K 1% 1/8W |
| R173 | 1-215-825-11 | RES,METAL 62K 1% 1/8W |
| R56 | 1-215-829-11 | RES,METAL 91K 1% 1/8W |
| R4,5,10,27,32,94,71,72, 117,167 | 1-215-830-11 | RES,METAL 100K 1% 1/8W |
| R11 | 1-216-237-00 | RES,CARBON 43K 5% 1/10W |
| RV13 | 1-228-456-00 | RES,VAR,CERMET 1K |
| RV3,5,15 | 1-228-459-00 | RES,VAR,CERMET 10K |
| RV1,6,16 | 1-228-460-00 | RES,VAR,CERMET 20K |
| RV14 | 1-228-461-00 | RES,VAR,CERMET 50K |
| RV2,4,12 | 1-228-462-00 | RES,VAR,CERMET 100K |
| RV7,8,9,10 | 1-230-740-21 | RES,VAR,CARBON 5K |
| RB2 | 1-231-449-00 | RES,BLOCK 620x8 |
| RB1 | 1-231-533-00 | RES,BLOCK 10Kx4 |
| RB4,6 | 1-231-549-11 | RES,BLOCK 47Kx4 |
| RB5 | 1-235-005-00 | RES,BLOCK 47Kx8 |
| BPF1 | 1-235-577-11 | FILTER,BANDPASS |
| L5 | 1-408-429-00 | INDUCTOR,MICRO 470 5% |
| LV1 | 1-410-288-11 | INDUCTOR,VAR 6.8 |
| DL2 | 1-415-431-11 | DELAY LINE,50nS |
| DL1 | 1-415-449-11 | DELAY LINE,20nS |
| L1,2,3,4 | 1-421-329-00 | COIL,CHOKE |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (SG-17 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-707-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| X1 | 1-527-585-00 | VCO,17.734475MHz |
| X2 | 1-527-729-00 | VCO,14.187500MHz |
| FB1,2 | 1-535-178-00 | FERRITE BEAD |
| S4,7,8,9 | 1-552-509-00 | SWITCH,DIP,1-CKT |
| S6 | 1-553-441-00 | SWITCH,TOGGLE |
| S2,3 | 1-570-277-11 | SWITCH,DIP,8-CKT |
| S1 | 1-570-280-11 | SWITCH,DIP,6-CKT |
| R28 | 1-807-239-11 | THERMISTOR,POSITIVE 3K |
| 4pcs | 2-282-313-00 | KNOB,CONTROL |
| 1pc | () 2-375-796-01 | LABEL (SG-17),PC BOARD |
| TP1,2,5,6,7,8,9 | () 3-673-772-41 | TERMINAL,TP |
| 1pc | () 3-673-865-00 | LEVER |
| 1pc | () 3-673-867-00 | PLATE,INDICATION,PC BOARD |
| TPE1,2,3,4,5,6 | () 3-685-366-11 | TERMINAL,TP |
| TP3,4,10,11,12,13,16, 17,18,19,20 | () 4-873-906-00 | TERMINAL,TP |
| 4pcs | 7-621-737-08 | SET SCREW 2.6x3,FLAT POINT |
| 4pcs | 7-621-981-15 | SCREW,PSW 2.6x6 |
| 2pcs | 7-626-317-21 | PIN,SPRING 2.5x8 |
| D11,14 | 8-719-000-12 | DIODE MC931 |
| D3 | 8-719-100-27 | DIODE RD4.7E-B2 |
| D10 | 8-719-812-41 | LED TLR124,RED |
| D9 | 8-719-812-43 | LED TLG124A,GREEN |
| D1,2,3,4,5,6,7,8,12,13, 15 | 8-719-901-33 | DIODE 1SS133 |
| Q4 | 8-729-115-30 | TRANSISTOR 2SK105A-GR |
| Q2,9 | 8-729-117-54 | TRANSISTOR 2SA1175 |
| Q3,6,7,8,10 | 8-729-190-12 | TRANSISTOR 2SC2901 |
| Q5,11 | 8-729-900-65 | TRANSISTOR DTA144ES |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (SG-17 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-707-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| IC1,1R | 8-743-810-00 | IC BX381 |
| IC7,12 | 8-757-930-11 | IC CX7930A |
| IC1Q | 8-759-103-19 | IC UPC319C |
| IC1S | 8-759-103-93 | IC UPC393C |
| IC3P,3Q,4P,4Q | 8-759-140-51 | IC UPD4051BC |
| IC2H,3R,4S,5J,5K,5R | 8-759-202-11 | IC TC74HC00P |
| IC4J,5T | 8-759-202-14 | IC TC74HC08P |
| IC3H,4H,4R | 8-759-202-22 | IC TC74HC74P |
| IC3C,4G,5P,5S | 8-759-202-86 | IC TC74HC123P |
| IC4A | 8-759-203-68 | IC TC74HC4040P |
| IC11 | 8-759-204-96 | IC TC74HC04F |
| IC8 | 8-759-205-11 | IC TC74HC153F |
| IC9 | 8-759-205-37 | IC TC74HC574F |
| IC2U | 8-759-301-24 | IC HD10124 |
| IC3N | 8-759-765-92 | IC,PROM MB7112E-PJD |
| IC5 | 8-759-766-28 | IC,PROM HN27C64G-SEC1 |
| IC4 | 8-759-766-78 | IC,PROM HN27C64G-PXL2 |
| IC2J,2L,2Q,2T,3F,4C,4F, 4L,4U | 8-759-900-00 | IC SN74LS00M |
| IC2D,4T | 8-759-900-04 | IC SN74LS04N |
| IC3J | 8-759-900-10 | IC SN74LS10N |
| IC6M,6R | 8-759-900-59 | IC HI1-0201-5 |
| IC2E,2M,2P,3T,5L,5Q | 8-759-900-74 | IC SN74LS74AN |
| IC4K,5H | 8-759-900-86 | IC SN74LS86N |
| IC2K,2R,6C | 8-759-901-23 | IC SN74LS123N |
| IC3D | 8-759-901-63 | IC SN74LS163AN |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (SG-17 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-707-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| IC3G | 8-759-901-64 | IC SN74LS164N |
| IC2G,2N,2S,3U | 8-759-902-21 | IC SN74LS221N |
| IC3E | 8-759-903-99 | IC SN74LS399N |
| IC3M | 8-759-904-09 | IC SN74LS688N |
| IC3K | 8-759-904-18 | IC SN74ALS00AN |
| IC5G | 8-759-904-79 | IC 74F00PC |
| IC1C,1D,2B | 8-759-906-07 | IC TL607CP |
| IC10 | 8-759-908-39 | IC CX7998 |
| IC3S | 8-759-917-65 | IC 74F193PC |
| IC1H,6G,6L | 8-759-918-23 | IC NE527N |
| IC2 | 8-759-918-30 | IC TL592P |
| IC2F | 8-759-918-33 | IC CX20160 |
| IC1F | 8-759-918-35 | IC CX20162 |
| IC3L | 8-759-918-40 | IC CX20194 |
| IC1A,1B,1L,2A,6D,6N | 8-759-990-82 | IC TL082CP |
| IC1P,6Q,6S | 8-759-990-84 | IC TL084CN |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|

PR-63 BOARD (BKH-2350/CARD RACK)
BOARD NO.1-615-708-11,12
SERIAL NO. UP TO 10699

| | | |
|---|---|---|
| 1pc () | A-6257-144-A | COMPLETE PCB,PR-63 |
| (This assembly includes the following parts.) | | |
| 1pc () | X-3673-641-0 | PLATE ASSY,SHIELD |
| C139 | 1-102-756-00 | CAP,CERAMIC 47PF 5% 50V |
| C308,309 | 1-107-075-00 | CAP,MICA 39PF 5% 50V |
| C38,303 | 1-107-076-00 | CAP,MICA 43PF 5% 50V |
| C112 | 1-107-079-00 | CAP,MICA 56PF 5% 50V |
| C48 | 1-107-159-00 | CAP,MICA 33PF 5% 500V |
| C344 | 1-107-204-00 | CAP,MICA 12PF 5% 500V |
| C341 | 1-107-206-00 | CAP,MICA 15PF 5% 500V |
| C80,105,145 | 1-107-209-00 | CAP,MICA 20PF 5% 500V |
| C133 | 1-107-210-00 | CAP,MICA 22PF 5% 500V |
| C140 | 1-107-211-00 | CAP,MICA 24PF 5% 500V |
| C121 | 1-109-537-00 | CAP,MICA 120PF 5% 100V |
| C130 | 1-109-539-00 | CAP,MICA 150PF 5% 100V |
| C122,155 | 1-109-541-00 | CAP,MICA 200PF 5% 100V |
| C26 | 1-109-546-00 | CAP,MICA 300PF 5% 100V |
| C147 | 1-109-547-00 | CAP,MICA 330PF 5% 100V |
| C300 | 1-109-549-00 | CAP,MICA 390PF 5% 100V |
| C78,96 | 1-109-553-00 | CAP,MICA 470PF 5% 100V |
| C111 | 1-109-554-00 | CAP,MICA 510PF 5% 100V |
| C114,116,165,167 | 1-123-307-00 | CAP,ELECT 100 20% 10V |
| C1,4,7,10,15,18,20,22, 25,28,31,32,54,55,62, 73,77,90,95,136,137, 150,152 | 1-123-318-00 | CAP,ELECT 33 20% 16V |
| C34,67 | 1-123-321-00 | CAP,ELECT 220 20% 16V |
| C160 | 1-130-471-00 | CAP,MYLAR 0.001 5% 50V |
| C53 | 1-130-479-00 | CAP,MYLAR 0.0047 5% 50V |
| C148 | 1-130-485-00 | CAP,MYLAR 0.015 5% 50V |
| C131,310 | 1-131-347-00 | CAP,TANT 1 10% 35V |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|

(PR-63 BOARD,BKH-2350/CARD RACK)
BOARD NO.1-615-708-11,12
SERIAL NO. UP TO 10699

| | | |
|---|---|---|
| C37,39,175 | 1-131-359-00 | CAP,TANT 10 10% 25V |
| C63,64,65,100,110,154, 159,170 | 1-131-373-00 | CAP,TANT 22 10% 16V |
| C113,142,156,157,158, 163,172 | 1-131-449-11 | CAP,TANT 3.3 20% 16V |
| CV1 | 1-141-260-00 | CAP,VAR 50PF |
| C2,3,6,8,9,11,12,13,14,16,17,19,21,23,24,27, 29,30,33,35,36,40,41,43,44,46,47,49,50,51, 52,56,57,58,59,60,61,66,68,69,70,71,72,74, 75,76,79,81,82,83,84,85,86,87,88,89,91,92, 93,94,97,98,99,101,102,103,104,106,107,108, 109,115,117,118,119,120,123,124,125,126, 127,128,129,132,134,135,138,141,143,144, 146,149,151,153,161,164,166,168,169,171, 173,174,302,304,305,306,307,340 | 1-161-894-00 | CAP,CERAMIC 0.1 +80/-20% 50V |
| R1,61,104 | 1-214-517-00 | RES,METAL 22 1% 1/8W |
| R26,41,52,306 | 1-214-525-00 | RES,METAL 47 1% 1/8W |
| R4,10,11,16,24,25,57,58, 59,63,75,144,314 | 1-214-526-00 | RES,METAL 51 1% 1/8W |
| R44,54,207,300,302 | 1-214-530-00 | RES,METAL 75 1% 1/8W |
| R8,39,97,111,129,131, 133,134,145,165,166, 177,204,209,211,224, 225,228,312,323,324, 327,328 | 1-214-533-00 | RES,METAL 100 1% 1/8W |
| R143,175 | 1-214-534-00 | RES,METAL 110 1% 1/8W |
| R45,109 | 1-214-535-00 | RES,METAL 120 1% 1/8W |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (PR-63 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-708-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| R6,9,223,329,333 | 1-214-537-00 | RES,METAL 150 1% 1/8W |
| R13,47,93,140,172,217 | 1-214-540-00 | RES,METAL 200 1% 1/8W |
| R18,56,80,112,135,136, 146,167,168,307,310 | 1-214-541-00 | RES,METAL 220 1% 1/8W |
| R30 | 1-214-542-00 | RES,METAL 240 1% 1/8W |
| R5,28,110 | 1-214-543-00 | RES,METAL 270 1% 1/8W |
| R7,66,72,89,90,127,163 | 1-214-544-00 | RES,METAL 300 1% 1/8W |
| R120,154,171,332 | 1-214-545-00 | RES,METAL 330 1% 1/8W |
| R15,49,50,51,98,99 | 1-214-546-00 | RES,METAL 360 1% 1/8W |
| R17,103,106,107,108 | 1-214-547-00 | RES,METAL 390 1% 1/8W |
| R86 | 1-214-548-00 | RES,METAL 430 1% 1/8W |
| R46,62,137,138,321,322, 325,326 | 1-214-549-00 | RES,METAL 470 1% 1/8W |
| R38,76,79,124,158,212 | 1-214-550-00 | RES,METAL 510 1% 1/8W |
| R43,91,126,128,162,164, 220,221,320 | 1-214-552-00 | RES,METAL 620 1% 1/8W |
| R48,82,308,309 | 1-214-553-00 | RES,METAL 680 1% 1/8W |
| R14,83 | 1-214-554-00 | RES,METAL 750 1% 1/8W |
| R35 | 1-214-555-00 | RES,METAL 820 1% 1/8W |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (PR-63 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-708-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| R21,29,32,37,60,64,65, 69,85,88,94,100,105, 118,152,169,305 | 1-214-557-00 | RES,METAL 1K 1% 1/8W |
| R95 | 1-214-558-00 | RES,METAL 1.1K 1% 1/8W |
| R27,53,73,74 | 1-214-559-00 | RES,METAL 1.2K |
| R34 | 1-214-563-00 | RES,METAL 1.8K 1% 1/8W |
| R77 | 1-214-564-00 | RES,METAL 2K 1% 1/8W |
| R12,113,114,115,117,121, 122,123,139,141,147, 148,149,151,155,156, 157,173,181,206,208, 229,303 | 1-214-565-00 | RES,METAL 2.2K 1% 1/8W |
| R20,23,78,160,161 | 1-214-566-00 | RES,METAL 2.4K 1% 1/8W |
| R218 | 1-214-568-00 | RES,METAL 3K 1% 1/8W |
| R87,92,101,102 | 1-214-569-00 | RES,METAL 3.3K 1% 1/8W |
| R179 | 1-214-571-00 | RES,METAL 3.9K 1% 1/8W |
| R19,31,36,42 | 1-214-572-00 | RES,METAL 4.3K 1% 1/8W |
| R55,178,180,182,213,216 | 1-214-573-00 | RES,METAL 4.7K 1% 1/8W |
| R189,200,201 | 1-214-574-00 | RES,METAL 5.1K 1% 1/8W |
| R22,330,331 | 1-214-575-00 | RES,METAL 5.6K 1% 1/8W |
| R3,84 | 1-214-576-00 | RES,METAL 6.2K 1% 1/8W |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (PR-63 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-708-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| R116,125,142,150,159, 174,202,203 | 1-214-577-00 | RES,METAL 6.8K 1% 1/8W |
| R185,186,187,193,194, 198 | 1-214-578-00 | RES,METAL 7.5K 1% 1/8W |
| R219 | 1-214-579-00 | RES,METAL 8.2K 1% 1/8W |
| R96 | 1-214-580-00 | RES,METAL 9.1K 1% 1/8W |
| R130,192,195,196,205, 227,304,311,313,316, 318,319,339,340 | 1-214-581-00 | RES,METAL 10K 1% 1/8W |
| R183 | 1-214-583-00 | RES,METAL 12K 1% 1/8W |
| R210 | 1-214-585-00 | RES,METAL 15K 1% 1/8W |
| R40,184,191,199 | 1-214-588-00 | RES,METAL 20K 1% 1/8W |
| R344 | 1-214-589-00 | RES,METAL 22K 1% 1/8W |
| R2 | 1-214-591-00 | RES,METAL 27K 1% 1/8W |
| R33 | 1-214-593-00 | RES,METAL 33K 1% 1/8W |
| R119,153 | 1-215-423-00 | RES,METAL 1.2K 1% 1/6W |
| R226 | 1-215-461-00 | RES,METAL 47K 1% 1/6W |
| R190,197 | 1-215-465-00 | RES,METAL 68K 1% 1/6W |
| R336 | 1-215-473-00 | RES,METAL 150K 1% 1/6W |
| R335 | 1-215-475-00 | RES,METAL 180K 1% 1/6W |
| R188 | 1-215-820-11 | RES,METAL 39K 1% 1/8W |
| R338 | 1-215-821-11 | RES,METAL 43K 1% 1/8W |
| R334 | 1-215-822-11 | RES,METAL 47K 1% 1/8W |
| R337 | 1-215-828-11 | RES,METAL 82K 1% 1/8W |
| R81,170,176,341 | 1-215-830-11 | RES,METAL 100K 1% 1/8W |
| RV4,9 | 1-228-453-00 | RES,VAR,CERMET 100 |
| RV3,12,15,30 | 1-228-455-00 | RES,VAR,CERMET 500 |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (PR-63 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-708-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| RV10 | 1-228-456-00 | RES,VAR,CERMET 1K |
| RV13,16,17,23 | 1-228-457-00 | RES,VAR,CERMET 2K |
| RV20,22 | 1-228-458-00 | RES,VAR,CERMET 5K |
| RV5,18,19,21 | 1-228-459-00 | RES,VAR,CERMET 10K |
| RV6,8,14 | 1-228-460-00 | RES,VAR,CERMET 20K |
| RV26,27,28 | 1-230-740-00 | RES,VAR,CARBON 5K |
| CR1 | 1-235-102-00 | CR BLOCK |
| LPF7 | 1-235-154-00 | FILTER,LOW-PASS |
| BPF1 | 1-235-168-00 | FILTER,BANDPASS |
| BPF4 | 1-235-578-11 | FILTER,BANDPASS |
| BPF2 | 1-235-580-11 | FILTER,BANDPASS |
| BPF3 | 1-235-581-11 | FILTER,BANDPASS |
| LPF2 | 1-235-582-11 | FILTER,LOW-PASS |
| LPF1 | 1-235-583-11 | FILTER,LOW-PASS |
| LPF4 | 1-235-584-11 | FILTER,LOW-PASS |
| LPF3 | 1-235-585-11 | FILTER,LOW-PASS |
| LPF5,6 | 1-235-586-12 | FILTER,LOW-PASS |
| L30 | 1-408-398-00 | INDUCTOR,MICRO 1.2 5% |
| L33 | 1-408-405-00 | INDUCTOR,MICRO 4.7 5% |
| L31 | 1-408-408-00 | INDUCTOR,MICRO 8.2 5% |
| L1,2,3,4,5,6,9,10,11,12, 13,14,15,16,17,18,19, 22 | 1-408-442-11 | INDUCTOR,MICRO 10 10% |
| LV4,5 | 1-410-287-11 | INDUCTOR,VAR,2.2 |
| LV10 | 1-410-292-11 | INDUCTOR,VAR,4.7 |
| LV1,2 | 1-410-338-11 | INDUCTOR,VAR 8.2 |
| DL4 | 1-415-430-11 | DELAY LINE,30nS |
| DL1 | 1-415-444-11 | DELAY LINE,GROUP DELAY:113nS |
| DL5 | 1-415-445-11 | DELAY LINE,1H (63.943uS) |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (PR-63 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-708-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| L7,8,20,21 | 1-421-329-00 | COIL,CHOKE |
| VCO1 | 1-527-585-00 | VCO,17.734475MHz |
| S4 | 1-552-509-00 | SWITCH,DIP,1-CKT |
| S2,3 | 1-553-441-00 | SWITCH,TOGGLE |
| J5,6 | 1-560-733-00 | PIN,SHORT |
| 2pcs | 1-561-832-00 | PLUG,SHORT |
| S1 | 1-570-280-11 | SWITCH,DIP,3-CKT |
| 3pcs | 2-282-313-00 | KNOB,CONTROL |
| 1pc () | 2-375-797-01 | LABEL (PR-63),PC BOARD |
| TP1,2,3,4,5,6,7,8,9,10, 11,12,13 () | 3-673-772-41 | TERMINAL,TP |
| 1pc () | 3-673-865-00 | LEVER |
| 1pc () | 3-673-867-00 | PLATE,INDICATION,PC BOARD |
| TPE1,2,3,4 () | 3-685-366-11 | TERMINAL,TP |
| 3pcs | 7-621-737-08 | SET SCREW 2.6x3,FLAT POINT |
| 4pcs | 7-621-981-15 | SCREW,PSW 2.6x6 |
| 2pcs | 7-626-317-21 | PIN,SPRING 2.5x8 |
| D2,5 | 8-719-175-07 | DIODE RD7.5E-B |
| D1 | 8-719-815-87 | DIODE 1S1587 |
| D3,4,6,7,9 | 8-719-901-33 | DIODE 1SS133 |
| D8 | 8-719-901-55 | DIODE 1SV55 |
| Q2,4,5,8,12,18 | 8-729-117-54 | TRANSISTOR 2SA1175 |
| Q13,14,16,17 | 8-729-606-34 | TRANSISTOR 2SC2603-G |
| Q3 | 8-729-658-32 | TRANSISTOR 2SC1583 |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (PR-63 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-708-11,12 | | |
| SERIAL NO. UP TO 10699 | | |
| Q1,7,9,10,11,15,19,20 | 8-729-672-43 | TRANSISTOR 2SC2724 |
| IC1,3,8,12,17,23 | 8-743-651-00 | IC BX365A |
| IC6,7 | 8-743-931-10 | IC BX3931A |
| IC36 | 8-749-938-30 | IC BX381 |
| IC43 | 8-752-006-00 | IC CX20060 |
| IC2,5,9 | 8-752-015-81 | IC CX20158 |
| IC39 | 8-752-306-50 | IC CX23065 |
| IC4 | 8-759-015-95 | IC MC1595L |
| IC29 | 8-759-202-24 | IC TC74HC86P |
| IC30 | 8-759-202-27 | IC TC74HC157P |
| IC38 | 8-759-300-25 | IC HD10125 |
| IC34 | 8-759-301-05 | IC HD10105 |
| IC14,18,20,24 | 8-759-700-95 | IC NJM1496M |
| IC27 | 8-759-900-02 | IC SN74LS02N |
| IC31 | 8-759-900-59 | IC HI1-0201-5 |
| IC41 | 8-759-900-74 | IC SN74LS74AN |
| IC42 | 8-759-901-53 | IC SN74LS153N |
| IC26,28,37 | 8-759-902-21 | IC SN74LS221N |
| IC16 | 8-759-904-20 | IC MB4002 |
| IC40 | 8-759-904-80 | IC 74F04PC |
| IC13,19 | 8-759-907-33 | IC UA733CN |
| IC33 | 8-759-918-23 | IC NE527N |
| IC25,35 | 8-759-918-42 | IC CX20196 |
| IC11,15,22 | 8-759-930-80 | IC CA3080E |
| IC10,21 | 8-759-990-82 | IC TL082CP |
| IC32 | 8-759-990-84 | IC TL084CN |

| or Q'ty | Part No. | Description |
|---|---|---|

PR-63 BOARD (BKH-2350/CARD RACK)
BOARD NO.1-615-708-13 & UP
SERIAL NO. 10701 & UP

| | | |
|---|---|---|
| 1pc () | A-6257-144-B | COMPLETE PCB,PR-63 |

(This assembly includes the following parts.)

| | | |
|---|---|---|
| 1pc () | X-3673-641-0 | PLATE ASSY,SHIELD |
| C139 | 1-102-756-00 | CAP,CERAMIC 47PF 5% 50V |
| C308,309 | 1-107-075-00 | CAP,MICA 39PF 5% 50V |
| C38,303 | 1-107-076-00 | CAP,MICA 43PF 5% 50V |
| C112 | 1-107-079-00 | CAP,MICA 56PF 5% 50V |
| C48 | 1-107-159-00 | CAP,MICA 33PF 5% 500V |
| C344 | 1-107-204-00 | CAP,MICA 12PF 5% 500V |
| C341 | 1-107-206-00 | CAP,MICA 15PF 5% 500V |
| C348 | 1-107-208-00 | CAP,MICA 18PF 5% 500V |
| C80,105,145 | 1-107-209-00 | CAP,MICA 20PF 5% 500V |
| C133 | 1-107-210-00 | CAP,MICA 22PF 5% 500V |
| C140 | 1-107-211-00 | CAP,MICA 24PF 5% 500V |
| C121 | 1-109-537-00 | CAP,MICA 120PF 5% 100V |
| C130 | 1-109-539-00 | CAP,MICA 150PF 5% 100V |
| C122,155 | 1-109-541-00 | CAP,MICA 200PF 5% 100V |
| C26 | 1-109-546-00 | CAP,MICA 300PF 5% 100V |
| C147 | 1-109-547-00 | CAP,MICA 330PF 5% 100V |
| C300 | 1-109-549-00 | CAP,MICA 390PF 5% 100V |
| C78,96 | 1-109-553-00 | CAP,MICA 470PF 5% 100V |
| C111 | 1-109-554-00 | CAP,MICA 510PF 5% 100V |
| C114,116,165,167 | 1-123-307-00 | CAP,ELECT 100 20% 10V |
| C1,4,7,10,15,18,20,22, 25,28,31,32,54,55,62, 73,77,90,95,136,137, 150,152 | 1-123-318-00 | CAP,ELECT 33 20% 16V |
| C34,67 | 1-123-321-00 | CAP,ELECT 220 20% 16V |
| C160 | 1-130-471-00 | CAP,MYLAR 0.001 5% 50V |
| C53 | 1-130-479-00 | CAP,MYLAR 0.0047 5% 50V |
| C148 | 1-130-485-00 | CAP,MYLAR 0.015 5% 50V |
| C131,310 | 1-131-347-00 | CAP,TANT 1 10% 35V |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|

(PR-63 BOARD,BKH-2350/CARD RACK)
BOARD NO.1-615-708-13 & UP
SERIAL NO. 10701 & UP

| | | |
|---|---|---|
| C37,39,175 | 1-131-359-00 | CAP,TANT 10 10% 25V |
| C63,64,65,100,110,154, 159,170 | 1-131-373-00 | CAP,TANT 22 10% 16V |
| C113,142,156,157,158, 163,172 | 1-131-449-11 | CAP,TANT 3.3 20% 16V |
| CV1 | 1-141-260-00 | CAP,VAR 50PF |
| C2,3,6,8,9,11,12,13,14,16,17,19,21,23,24,27, 29,30,33,35,36,40,41,43,44,46,47,49,50,51, 52,56,57,58,59,60,61,66,68,69,70,71,72,74, 75,76,79,81,82,83,84,85,86,87,88,89,91,92, 93,94,97,98,99,101,102,103,104,106,107,108, 109,115,117,118,119,120,123,124,125,126, 127,128,129,132,134,135,138,141,143,144, 146,149,151,153,161,164,166,168,169,171, 173,174,302,304,305,306,307,340,345,346, 347 | 1-161-894-00 | CAP,CERAMIC 0.1 +80/-20% 50V |
| R1,61,104 | 1-214-517-00 | RES,METAL 22 1% 1/8W |
| R26,41,52,306 | 1-214-525-00 | RES,METAL 47 1% 1/8W |
| R4,10,11,16,24,25,57,58, 59,63,75,144,314 | 1-214-526-00 | RES,METAL 51 1% 1/8W |
| R44,54,207,300,302 | 1-214-530-00 | RES,METAL 75 1% 1/8W |
| R8,39,97,111,129,131, 133,134,145,165,166, 177,204,209,211,224, 225,228,312,323,324, 327,328 | 1-214-533-00 | RES,METAL 100 1% 1/8W |
| R143,175 | 1-214-534-00 | RES,METAL 110 1% 1/8W |
| R45,109 | 1-214-535-00 | RES,METAL 120 1% 1/8W |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (PR-63 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-708-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| R6,9,223,329,333 | 1-214-537-00 | RES,METAL 150 1% 1/8W |
| R13,47,93,140,172,217 | 1-214-540-00 | RES,METAL 200 1% 1/8W |
| R18,56,80,112,135,136, 146,167,168,307,310 | 1-214-541-00 | RES,METAL 220 1% 1/8W |
| R30 | 1-214-542-00 | RES,METAL 240 1% 1/8W |
| R5,28,110 | 1-214-543-00 | RES,METAL 270 1% 1/8W |
| R7,66,72,89,90,127,163 | 1-214-544-00 | RES,METAL 300 1% 1/8W |
| R120,154,171,332 | 1-214-545-00 | RES,METAL 330 1% 1/8W |
| R15,49,50,51,98,99 | 1-214-546-00 | RES,METAL 360 1% 1/8W |
| R17,103,106,107,108 | 1-214-547-00 | RES,METAL 390 1% 1/8W |
| R86 | 1-214-548-00 | RES,METAL 430 1% 1/8W |
| R46,62,137,138,321,322, 325,326 | 1-214-549-00 | RES,METAL 470 1% 1/8W |
| R38,76,79,124,158,212 | 1-214-550-00 | RES,METAL 510 1% 1/8W |
| R43,91,126,128,162,164, 220,221,320 | 1-214-552-00 | RES,METAL 620 1% 1/8W |
| R48,82,308,309 | 1-214-553-00 | RES,METAL 680 1% 1/8W |
| R14,83 | 1-214-554-00 | RES,METAL 750 1% 1/8W |
| R35 | 1-214-555-00 | RES,METAL 820 1% 1/8W |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (PR-63 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-708-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| R21,29,32,37,60,64,65, 69,85,88,94,100,105, 118,152,169,305,347, 348 | 1-214-557-00 | RES,METAL 1K 1% 1/8W |
| R95 | 1-214-558-00 | RES,METAL 1.1K 1% 1/8W |
| R27,53,73,74 | 1-214-559-00 | RES,METAL 1.2K |
| R34 | 1-214-563-00 | RES,METAL 1.8K 1% 1/8W |
| R77 | 1-214-564-00 | RES,METAL 2K 1% 1/8W |
| R12,113,114,115,117,121, 122,123,139,141,147, 148,149,151,155,156, 157,173,181,206,208, 229,303 | 1-214-565-00 | RES,METAL 2.2K 1% 1/8W |
| R20,23,78,160,161,346 | 1-214-566-00 | RES,METAL 2.4K 1% 1/8W |
| R218 | 1-214-568-00 | RES,METAL 3K 1% 1/8W |
| R87,92,101,102 | 1-214-569-00 | RES,METAL 3.3K 1% 1/8W |
| R179 | 1-214-571-00 | RES,METAL 3.9K 1% 1/8W |
| R19,31,36,42,345 | 1-214-572-00 | RES,METAL 4.3K 1% 1/8W |
| R55,178,180,182,213,216 | 1-214-573-00 | RES,METAL 4.7K 1% 1/8W |
| R189,200,201 | 1-214-574-00 | RES,METAL 5.1K 1% 1/8W |
| R22,330,331 | 1-214-575-00 | RES,METAL 5.6K 1% 1/8W |
| R3,84 | 1-214-576-00 | RES,METAL 6.2K 1% 1/8W |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (PR-63 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-708-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| R116,125,142,150,159, 174,202,203 | 1-214-577-00 | RES,METAL 6.8K 1% 1/8W |
| R185,186,187,193,194, 198 | 1-214-578-00 | RES,METAL 7.5K 1% 1/8W |
| R219 | 1-214-579-00 | RES,METAL 8.2K 1% 1/8W |
| R96 | 1-214-580-00 | RES,METAL 9.1K 1% 1/8W |
| R130,192,195,196,205, 227,304,311,313,316, 318,319,339,340 | 1-214-581-00 | RES,METAL 10K 1% 1/8W |
| R183 | 1-214-583-00 | RES,METAL 12K 1% 1/8W |
| R210 | 1-214-585-00 | RES,METAL 15K 1% 1/8W |
| R40,184,191,199 | 1-214-588-00 | RES,METAL 20K 1% 1/8W |
| R344 | 1-214-589-00 | RES,METAL 22K 1% 1/8W |
| R2 | 1-214-591-00 | RES,METAL 27K 1% 1/8W |
| R33 | 1-214-593-00 | RES,METAL 33K 1% 1/8W |
| R119,153 | 1-215-423-00 | RES,METAL 1.2K 1% 1/6W |
| R226 | 1-215-461-00 | RES,METAL 47K 1% 1/6W |
| R190,197 | 1-215-465-00 | RES,METAL 68K 1% 1/6W |
| R336 | 1-215-473-00 | RES,METAL 150K 1% 1/6W |
| R335 | 1-215-475-00 | RES,METAL 180K 1% 1/6W |
| R188 | 1-215-820-11 | RES,METAL 39K 1% 1/8W |
| R338 | 1-215-821-11 | RES,METAL 43K 1% 1/8W |
| R334 | 1-215-822-11 | RES,METAL 47K 1% 1/8W |
| R337,349 | 1-215-828-11 | RES,METAL 82K 1% 1/8W |
| R81,170,176,341 | 1-215-830-11 | RES,METAL 100K 1% 1/8W |
| RV4,9 | 1-228-453-00 | RES,VAR,CERMET 100 |
| RV3,12,15,30 | 1-228-455-00 | RES,VAR,CERMET 500 |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (PR-63 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-708-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| RV10 | 1-228-456-00 | RES,VAR,CERMET 1K |
| RV13,16,17,23 | 1-228-457-00 | RES,VAR,CERMET 2K |
| RV20,22 | 1-228-458-00 | RES,VAR,CERMET 5K |
| RV5,18,19,21 | 1-228-459-00 | RES,VAR,CERMET 10 |
| RV6,8,14,24 | 1-228-460-00 | RES,VAR,CERMET 20 |
| RV26,27,28 | 1-230-740-00 | RES,VAR,CARBON 5K |
| CR1 | 1-235-102-00 | CR BLOCK |
| LPF7 | 1-235-154-00 | FILTER,LOW-PASS |
| BPF1 | 1-235-168-00 | FILTER,BANDPASS |
| BPF4 | 1-235-578-11 | FILTER,BANDPASS |
| BPF2 | 1-235-580-11 | FILTER,BANDPASS |
| BPF3 | 1-235-581-11 | FILTER,BANDPASS |
| LPF2 | 1-235-582-11 | FILTER,LOW-PASS |
| LPF1 | 1-235-583-11 | FILTER,LOW-PASS |
| LPF4 | 1-235-584-11 | FILTER,LOW-PASS |
| LPF3 | 1-235-585-11 | FILTER,LOW-PASS |
| LPF5,6 | 1-235-586-12 | FILTER,LOW-PASS |
| L30 | 1-408-398-00 | INDUCTOR,MICRO 1.2 5% |
| L33 | 1-408-405-00 | INDUCTOR,MICRO 4.7 5% |
| L31 | 1-408-408-00 | INDUCTOR,MICRO 8.2 5% |
| L1,2,3,4,5,6,9,10,11,12, 13,14,15,16,17,18,19, 22 | 1-408-442-11 | INDUCTOR,MICRO 10 10% |
| LV4,5 | 1-410-287-11 | INDUCTOR,VAR,2.2 |
| LV10 | 1-410-292-11 | INDUCTOR,VAR,4.7 |
| LV1,2 | 1-410-338-11 | INDUCTOR,VAR 8.2 |
| DL4 | 1-415-430-11 | DELAY LINE,30nS |
| DL1 | 1-415-444-11 | DELAY LINE,GROUP DELAY:113nS |
| DL5 | 1-415-445-11 | DELAY LINE,1H (63.943uS) |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (PR-63 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-708-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| L7,8,20,21 | 1-421-329-00 | COIL,CHOKE |
| VCO1 | 1-527-585-00 | VCO,17.734475MHz |
| S4 | 1-552-509-00 | SWITCH,DIP,1-CKT |
| S2,3 | 1-553-441-00 | SWITCH,TOGGLE |
| JP1,2,5,6 | 1-560-733-00 | PIN,SHORT |
| 2pcs | 1-561-832-00 | PLUG,SHORT |
| S1 | 1-570-280-11 | SWITCH,DIP,3-CKT |
| 3pcs | 2-282-313-00 | KNOB,CONTROL |
| 1pc () | 2-375-797-01 | LABEL (PR-63),PC BOARD |
| TP1,2,3,4,5,6,7,8,9,10, 11,12,13,14 () | 3-673-772-41 | TERMINAL,TP |
| 1pc () | 3-673-865-00 | LEVER |
| 1pc () | 3-673-867-00 | PLATE,INDICATION,PC BOARD |
| TPE1,2,3,4 () | 3-685-366-11 | TERMINAL,TP |
| 3pcs | 7-621-737-08 | SET SCREW 2.6x3,FLAT POINT |
| 4pcs | 7-621-981-15 | SCREW,PSW 2.6x6 |
| 2pcs | 7-626-317-21 | PIN,SPRING 2.5x8 |
| D2,5 | 8-719-175-07 | DIODE RD7.5E-B |
| D1 | 8-719-815-87 | DIODE 1S1587 |
| D3,4,6,7,9 | 8-719-901-33 | DIODE 1SS133 |
| D8 | 8-719-901-55 | DIODE 1SV55 |
| Q2,4,5,8,12,18 | 8-729-117-54 | TRANSISTOR 2SA1175 |
| Q13,14,16,17 | 8-729-606-34 | TRANSISTOR 2SC2603-G |
| Q3 | 8-729-658-32 | TRANSISTOR 2SC1583 |
| Q1,7,9,10,11,15,19,20 | 8-729-672-43 | TRANSISTOR 2SC2724 |

| Ref.No. or Q'ty | Part No. | Description |
|---|---|---|
| (PR-63 BOARD,BKH-2350/CARD RACK) | | |
| BOARD NO.1-615-708-13 & UP | | |
| SERIAL NO. 10701 & UP | | |
| IC1,3,8,12,17,23 | 8-743-651-00 | IC BX365A |
| IC6,7 | 8-743-931-10 | IC BX3931A |
| IC36 | 8-749-938-30 | IC BX381 |
| IC43 | 8-752-006-00 | IC CX20060 |
| IC2,5,9,44 | 8-752-015-81 | IC CX20158 |
| IC39 | 8-752-306-50 | IC CX23065 |
| IC4 | 8-759-015-95 | IC MC1595L |
| IC29 | 8-759-202-24 | IC TC74HC86P |
| IC30 | 8-759-202-27 | IC TC74HC157P |
| IC38 | 8-759-300-25 | IC HD10125 |
| IC34 | 8-759-301-05 | IC HD10105 |
| IC14,18,20,24 | 8-759-700-95 | IC NJM1496M |
| IC27 | 8-759-900-02 | IC SN74LS02N |
| IC31 | 8-759-900-59 | IC HI1-0201-5 |
| IC41 | 8-759-900-74 | IC SN74LS74AN |
| IC42 | 8-759-901-53 | IC SN74LS153N |
| IC26,28,37 | 8-759-902-21 | IC SN74LS221N |
| IC16 | 8-759-904-20 | IC MB4002 |
| IC40 | 8-759-904-80 | IC 74F04PC |
| IC13,19 | 8-759-907-33 | IC UA733CN |
| IC33 | 8-759-918-23 | IC NE527N |
| IC25,35 | 8-759-918-42 | IC CX20196 |
| IC11,15,22 | 8-759-930-80 | IC CA3080E |
| IC10,21 | 8-759-990-82 | IC TL082CP |
| IC32 | 8-759-990-84 | IC TL084CN |

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